NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

CORRECTIONS AND IMPROVEMENTS TO THE
INTERACTIVE COMPUTER PROGRAM FOR THE SURVIVABILITY
EVALUATION OF AIRCRAFT CONCEPTUAL DESIGNS (VISAP)

by

Ronald Maxwell Hill

March 1983

Thesis Advisor: R. E. Ball

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A computer program for assessing the survivability of fixed wing aircraft in the conceptual design phase was developed at the Naval Postgraduate School by Ball and Hesser in 1982. The program was called VISAP (Vought Interactive Survivability Assessment Program). This thesis presents corrections and improvements made to VISAP by the author. These corrections and improvements include improved efficiency and friendliness of the program from the user's viewpoint, enhanced output, and the incorporation of graphics to aid in the assessment and evaluation of aircraft conceptual design.

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Corrections and Improvements to the Interactive Computer Program for the Survivability Evaluation of Aircraft Conceptual Designs (VISAP)

by

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ABSTRACT

A computer program for assessing the survivability of fixed wing aircraft in the conceptual design phase was developed at the Naval Postgraduate School by Ball and Hesser in 1982. The program was called VISAP (Vought Interactive Survivability Assessment Program). This thesis presents corrections and improvements made to VISAP by the author. These corrections and improvements include improved efficiency and friendliness of the program from the user's viewpoint, enhanced output, and the incorporation of graphics to aid in the assessment and evaluation of aircraft conceptual design.

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To my bride of ten months, Mary Ann, for her love, devotion, and limitless patience. Her advice was timely, consistent, and unfailingly wise.

I. INTRODUCTION

A. SURVIVABILITY (P(s))

Aircraft combat survivability is defined as the capability of an aircraft to avoid and/or withstand a man-made hostile environment. This ability to avoid or withstand the hostile environment is a function of several factors both inherent in and external to the aircraft. Survivability is quantifiable using basic probability theory and can be expressed as unity minus the product of the aircraft's susceptibility and the aircraft's vulnerability.

$$P(s) = 1 - \text{Susceptibility} \times \text{Vulnerability} \quad (1)$$

1. Susceptibility (P(h))

Susceptibility is the aircraft's inability to avoid the hostile environment. It can be expressed as the probability that the aircraft is hit (P(h)), it is influenced by a multitude of factors. Generally, these factors consist of the threat activity, the threat sensors, the threat tracking ability and the threat propagator. These factors can also be quantified. They can be expressed as the probability of activity (P(a)), the probability of detection (P(d)), the probability of conversion (P(c)), and the probability of damage (P(dam)).

$$P(h) = P(a) \times P(d) \times P(c) \times P(dam) \quad (2)$$

Susceptibility can be reduced by one or more means. Prominent are threat suppression (reduction of the threat's activity or ability to act), signature reduction (minimizing the aircraft's visual, aural, and electromagnetic emissions or reflections), and overt countermeasures (interference with the threat's ability to track or engage the aircraft).

2. Vulnerability (P(k/h))

Once hit by a damage causing mechanism, such as a fragment or projectile, the reaction of the aircraft is dependent upon its vulnerability. The vulnerability levels may range from no effect through catastrophic destruction, with intermediate effects including but not limited to mission degradation, system or subsystem malfunctions, and component failures.

Vulnerability is often measured using the concept of vulnerable area. An aircraft presents a projected area (A(p)) depending on the aspect of the observer or tracking system. Each aircraft critical component has its own vulnerable area that contributes to the total aircraft vulnerable area (A(v)). The vulnerability of the aircraft can also be measured by the ratio of the aircraft vulnerable area to the aircraft presented area.

$$P(k/h) = A(v) / A(p) \qquad (3)$$

P(k/h) is the probability the aircraft is killed given a hit.

B. VISAP

"The Development of an Interactive Computer Program for the Evaluation of Aircraft Conceptual Designs" [Ref. 1] was the result of the compilation of numerous efforts to perform survivability assessments in the conceptual design phase utilizing deterministic models. The computer programs, collectively called the VISAP (Vought Interactive Survivability Assessment Program) program, eloquently allow the designer or analyst to investigate the effects on survivability of altering, singly or in groups, the aircraft's design features, its vulnerability and susceptibility reduction features, and/or the threat environment parameters. Results of a single sortie and

a campaign analysis and the incremental increases to the aircraft's take-off gross weight are used as measures of effectiveness.

VISAP is also the filename of the CMS control EXEC designed for use on the Naval Postgraduate School's IBM 3033 computer. When executed, it presents the user with the choice of one of three aircraft types to analyze. These types are Fighter Escort, Long Range Strike, and Close Air Support. Each type is assessed by independent programs with filenames of ESCORT, STRIKE, and SUPPORT respectively.

Each program solves the survivability equation using values calculated from the design parameters chosen by the user from "menus" incorporated into the programs and automatically displayed on the user's terminal at the appropriate time during program execution. Subsidiary routines and subroutines either correlate the inputs with tabulated data or do deterministic calculations to produce values for, ultimately, the probability of survival (P(s)) for a design of an aircraft type against predetermined threats. Three subroutines are utilized to determine the results of the single sortie of an aircraft, to conduct a campaign analysis consisting of several flights by many aircraft, and to show a comparison between the new and the original gross weights.

Parameter values are displayed on the terminal while the user is running the program. Changes made are immediately indicated, and the values calculated from the changes are also displayed when appropriate. In addition, upon completion of a design, a hard copy printout may be obtained if desired. This printout contains the susceptibility and vulnerability reduction features, values for P(s), P(d), P(h), and P(k/h),

results of the campaign analysis, the baseline takeoff gross weight, and the enhanced gross weight.

C. CONCLUSION

VISAP was an immense improvement over the previous requirements to correlate masses of emperical and analytic data. The elimination of time consuming, tedious, and, therefore, error prone hand calculations is, of course, the principle benefit of the programs.

II. NATURE OF THE PROBLEM

A. INTRODUCTION

VISAP was used at the Naval Postgraduate School in course AE-3251, Aircraft Combat Survivability during the Spring Quarter 1982. Students were assigned the task of analyzing survivability enhancements on the three available aircraft types. While the results of this project were generally favorable, several inadequacies were discovered in the programs. Furthermore, solicited comments from industry and government activities studying the program pointed out other errors and several suggestions for improvement. The gist of the significant errors, inadequacies, and recommendations are:

1. Erroneous output in some cases
2. Inaccuracies in the "HELP" menus
3. Excessive time to work through a design
4. Inability to save design changes from one run to the next
5. Necessity to reenter each point in the program to duplicate a design
6. Requirement to rerun an entire program to assess the effects of a change to a parameter
7. Limited data on printouts making comparisons between the design and effects difficult
8. Questionable validity of the results
9. No provisions for cost information provided
10. Lack of graphical presentation of results

B. SPECIFICS OF THE PROBLEM

Difficulties with VISAP in general are categorized as follows:

1. The data output and validity of results were suspect due to random and obviously erroneous results. Several minor corrections in the subroutine programming were identified. The corrections to this and other problems will be discussed in more detail in the next chapter. The methodology used to develop the algorithms for the programs' subroutines are not questioned.

2. Inaccuracies and garbled text in the "HELP" menus were identified. Proper interpretations were researched in "The Fundamentals of Aircraft Combat Survivability Analysis and Design" [Ref. 2]. Specifically, the help menu 6's equation for P(s) was incorrect, P(S) = P(D)*P(H)*P(K/H) instead of the correct, P(S) = 1 - (P(D)*P(H)*P(K/H)). Also, HELP menu 3 contained a nonsense line reading, "of study as the A/C type defined them."

3. Students universally complained about an excessive amount of time to complete an evaluation. The inability to save the results of a design effort by means other than reaccessing VISAP at the beginning and having to reenter all previously chosen data was also of concern. The need for a data saving and retrieval routine, in addition to the established capability to automatically reenter the program at the completion of a run, was established. Furthermore, once the user familiarizes himself/herself with program operation, stepping through each sequence becomes redundant. Therefore, a means to automatically assess individual design changes was required.

4. Accompanying item 3 above was the necessity to expand the output. To help identify a design analysis and to correlate which parameter affected which measure of effectiveness, the printouts required design and performance information in addition to the susceptibility and vulnerability reduction features already presented.

5. To enhance industry use, cost information was recommended for inclusion in VISAP. While costing was a major emphasis in the preliminary research, it was not incorporated in Reference 1 and is also considered beyond the scope of the current project.

6. A graphical presentation of an assessment seemed a logical application of VISAP. In fact, a bar chart depicting aircraft loss rate or P(k) versus the threat types was a requirement for the AE-3251 project. A means to utilize some of the graphics utilities available at the Naval Postgraduate School was, therefore, made a requirement.

C. CONCLUSION

Chapter three will delve into the details of the changes and corrections made to the version of VISAP described in Reference 1. The intention of continuing work on VISAP was to improve the efficiency of the program, extend its applicability, and broaden the range of useful information produced. The basic methodologies, approach to the solution, and programming techniques were all considered suitable and, therefore, the corrections and additions are principally enhancements to the basic programs.

III. SOLUTIONS

A. GENERAL

The solutions will be discussed in the same order as the problems to which they relate were delineated in Chapter II. Additionally, appendixes E-G, the program listings, have been annotated with a numbered comment card (c ## ----) preceding each section that has been altered from the original version of VISAP. The number (##) in the comment refers to the like numbered statements of the following paragraphs.

B. SOLUTION SPECIFICS

Corrective action for the problems were developed as follows:

1. Random, erroneous output values were the result of computational errors, programming errors, and the use of mixed mode arithmetic (i.e., integer instead of real data). These errors occurred in the SORT and CAMP subroutines of all three programs. Mixed mode was also discovered in SUPPORT in the Menu 41 section on Vulnerable Area/P(k) vs. AAA, in the SRPDSM, the SRVAAA, and the SRPHR subroutines, in the STRIKE subroutines SSRPDS and ESRWT, and the ESCORT ESRAVG and ESRWT subroutines. The affected sections and subroutines were analyzed, corrected, and now check against hand calculated values for sample cases.

2. Inaccuracies and garbled text in the "HELP" menus as mentioned in Chapter II were identified. The text with corrections has been retyped maintaining the existing format.

3. Incorporation of routines to save data and modifications of the program flow to expedite the time required to perform an evaluation have been made. Data is now retained in a disk file and is continually updated as particular parameters or values change during program execution. At program termination, or any time MENU 7, the assessment routine, is executed, current data is "dumped" to the data file. Separate files, named ESCORT DATA, STRIKE DATA, and SUPPORT DATA, are maintained for the respective aircraft types. When reentering a program, the user is given the option of using either his previously defined data or the default values specified in the declaration section of the program.

The programs are now written to cause an automatic assessment any time a variable is changed. This is accomplished with "GO TO" statements in the menus Main, 2, 3, 4, 5, and 6 which force the program to execute Menu 7, to evaluate gross weight changes (subroutines ESRWT or SSRWT), and to record all values in the data file.

Following the evaluation, when the user exits the program, the current assessment is displayed on the terminal. He/she may opt to have this information printed, then exit; reenter the program; or exit without a printout.

4. The printouts themselves include new sections. The full title of the aircraft type is spelled out. For example, "Long Range Strike Aircraft" replaces the abbreviated "Strike Aircraft" used previously. Performance features, mission parameters, and threat parameters are enumerated, in addition to the existing susceptibility and vulnerability reduction features. These additions facilitate the identification of

the cause and effect relationships between the independent design variables and the resulting changes in the survivability assessment.

The augmented printouts are produced by rewritten statements in the Exit routines' "WRITE" statements and their associated "FORMAT" statements. Furthermore, this output is identical to that displayed on the terminal screen which was discussed in objective 3. This is accomplished by incorporating repetitive "WRITE" statements with the unit codes changed to direct output to the terminal instead of the printer.

5. Graphics capability posed many possibilities and a multitude of alternatives. First, consideration had to be given to what information was to be presented. Since the Probability of Survival (P(s)) or the Probability of Kill (P(k)) provides a comprehensive, quantifiable evaluation of a design, the choices were immediately limited to one of these. Of the two, Probability of Kill, against each of the threat types, was arbitrarily picked since it was anticipated to show a decreasing trend for each successive design which seems more esthetically pleasing. Second, a decision concerning the format of the graph was needed. A bar chart was picked for its simplicity and to remain consistent with the AE-3251 project objectives. Third, several plotting devices are available that can be accessed either directly from VISAP or separately by the user. The dual screen IBM 3277/Tektronix 618 system at NPS was chosen due to its availability and its ability to produce both a CRT display and a hard copy printout. The user must decide upon which assessments to have plotted, and then, subsequent to exiting the program but at his/her convenience, he/she may obtain graphs of the chosen designs. Finally, the numbers of

assessments to be depicted had to be determined. In keeping with prior requirements, and in an effort to supply adequate information and yet prevent the charts from becoming cluttered, a total of three design alternatives are presented. These are indicated on the graphs by separate bars corresponding to a Baseline, a 1st Design, and a 2nd Design. Three bars corresponding to the three alternative designs are clustered vertically above the appropriate threat type. Figure 1 shows a typical plot.

VISAP MENU 8 was written to calculate the Probability of Kill against each threat type.

$$P(k) = 1. - P(s) \tag{4}$$

Menu 8, additionally incorporates routines to query the user about his plotting intentions, to provide him/her with further plotting procedure information, and to file the data required for the plots. When Menu 8 is executed, the user is informed as to how many designs he has selected for plotting (i.e., 0 of 3, 1 of 3, or 2 of 3) and is given the opportunity to access a HELP MENU 8 which was written to provide further information concerning plot procedures. If the user decides to have the current design depicted, VISAP files the plotting data in disk files named ESCPLT DATA, STRPLT DATA, or SUPPLT DATA, respectively, from the ESCORT, STRIKE or SUPPORT programs. These plot data files are distinct from the aforementioned "save" data files.

The DISSPLA (a Proprietary Software Product of Integrated Software Systems Corporation) system was utilized to write separate Fortran IV programs for each aircraft type. Named ESCPLT, STRPLT, and SUPPLT, they peruse their respective data files, format the presentation, and direct

EXAMPLE AIRCRAFT

Loss Rate VS. Threat Type

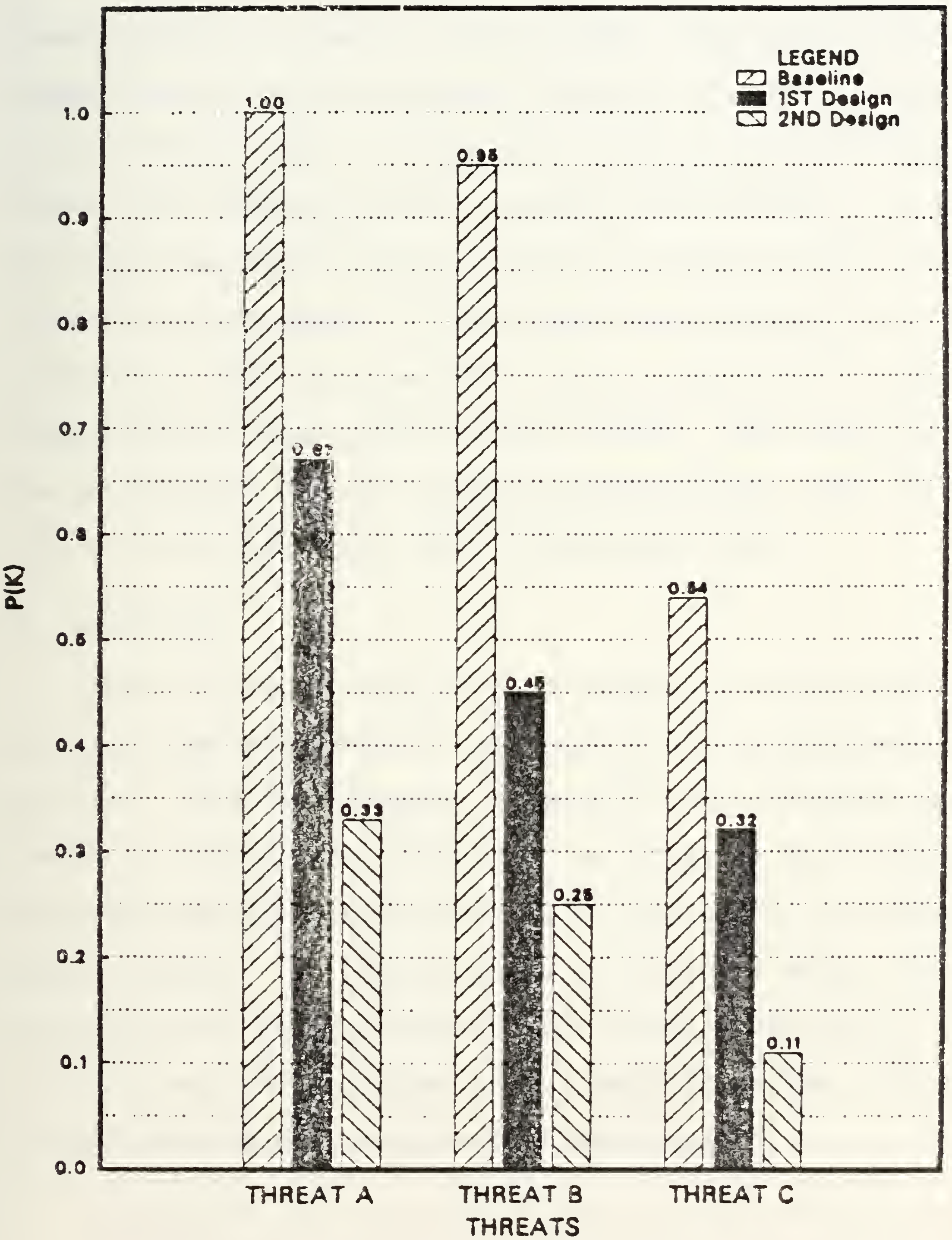

Figure 1. EXAMPLE PLOT

the output to the Tektronix 618 display screen. The user simply presses the "HARD COPY" key below the screen to obtain a printed copy assuming, of course, the screen in use is attached to a printer.

ESCPLT, etc., are controlled by a CMS EXEC called DISVIS. The user operates DISVIS in a manner similar to VISAP. When seated before a dual screen terminal, and having accessed DISVIS, he/she enters the plot desired (ESCPLT, STRPLT, or SUPPLT) and the proper graph will automatically appear on the adjoining screen. One caution must be noted. The user must have made three design selections during one terminal session prior to attempting a plot request. If fewer than three data points are filed, DISSPLA will inform the viewer that "the end of data file" on the appropriate unit number (disk) has been reached. While some sort of graph may be presented, there will probably be depicted zero values, erroneous P(k)'s or other even more erratic or undesirable output.

C. CONCLUSION

VISAP as currently configured is an extensive, highly versatile, and efficient computer program or, more properly, an interdependent system of programs. While "user friendly," by design, it still produces voluminous amounts of information containing both the detail and the broad overview required to perform effective survivability assessments on aircraft conceptual designs. This version retains the original's modular form, allowing easier "debugging" and possible further modifications. Additionally, menus and subroutines can be changed or new ones added easily without affecting the other aspects of the program.

No project is complete without comment concerning recommendations for further possible improvements. VISAP could encompass other aircraft types, for instance, helicopters and their variety of applications. To enhance industrial usage, current cost of aircraft and the ramifications upon those costs of alternative survivability related components need to be integrated into VISAP.

APPENDIX A

VARIABLES, SUBROUTINES, AND DEFINITIONS

A.1. ESCORT

A.1.1. Menu 2 Design

A.1.1.1. Menu 21 Aircraft Performance Inputs

TW	thrust to weight ratio
WS	wing loading
WT	ordnance weight
B	wing span
XL	fuselage length
W	fuselage width
EC	engine face to quarter chord
ED	engine diameter
EL	engine length
DL	duct length

A.1.1.2. Menu 22 Susceptibility Features

JAM	jammer number
IRCS	RCS reduction level
IWARN	RWR installed/not installed value
ICHAFF	chaff dispenser installed/not installed value
IRJAM	IR jammer installed/not installed value
IRFLAR	IR flare dispenser installed/not installed value
IRSUP	IR suppression susceptibility value

A.1.1.3. Menu 23 Vulnerability Features

IFS	general fuel system vulnerability value
IFV	fuel/void interface vulnerability value
IFE	fuel/engine interface vulnerability value
IEA	engine arrangement vulnerability value
IEP	engine protection vulnerability value
ICS	control system vulnerability value
ICA	crew arrangement vulnerability value

A.1.2. Menu 3 Combat Scenario

A.1.2.1. Menu 31 Mission Description

XMDA	mission dash altitude
XMDM	mission dash distance
XMDD	mission dash Mach number

A.1.2.2. Menu 32 Threat Definition

AAH	air-to-air threat density
AAD	air-to-air threat diameter
AAL	air-to-air threat penetration distance
SAMH	low altitude SAM threat density
SAMD	low altitude SAM threat diameter
SAML	low altitude SAM threat penetration distance

A.1.3. Menu 4 Susceptibility Assessment

A.1.3.1. Menu 41 Probability of Detection

PDAAG	P(d) by air-to-air guns
PDAAM	P(d) by air-to-air IR missiles
PDSM	P(d) by low altitude SAM

A.1.3.2. Menu 42 Probability of Hit

PHG	P(h) by air-to-air guns
PHM	P(h) by air-to-air IR missile
PHSM	P(h) by low altitude SAM

A.1.4. Menu 5 Vulnerability Assessment

A.1.4.1. Menu 51 Vulnerable Area and Probability of Kill Given a Hit

APAAG	presented area to air-to-air guns
AVAAG	vulnerable area to air-to-air guns
PKHAAG	P(k/h) by air-to-air guns
AVAAM	vulnerable area to air-to-air IR missile
PKHAAM	P(k/h) by air-to-air IR missile
VASM	vulnerable area to low altitude SAM
PKHSM	P(k/h) by low altitude SAM

A.1.5. Menu 6 Survivability Assessment

A.1.5.1. Menu 61 Probability of Survival

PSAG	P(s) vs. air-to-air guns
PSAM	P(s) vs. air-to-air IR missile
PSSM	P(s) vs. low altitude SAM

A.1.5.2. Menu 62 Sortie Analysis

ACR	number of aircraft in single sortie
XNPASS	number of targets attacked by aircraft per sortie
ACR2	number of aircraft ready for next sortie
TOTSR	total sorties flown
TOTACK	total targets attacked
TOTACL	total aircraft lost

TOTACR total aircraft in repair at end

SORT subroutine to perform sortie analysis

A.1.5.3. Menu 63 Campaign Analysis

ACR1 number of aircraft in campaign

NSRT number of raids in the campaign

NS maximum number of sorties for repair

A.1.6. Menu 7 Reassessment

ESRPDS subroutine: P(d) by low altitude SAM

ESRPHG subroutine: P(h) by air-to-air guns

ESRPHM subroutine: P(h) by air-to-air IR missile

ESRPHS subroutine: P(h) by low altitude SAM

ESRAVG subroutine: A(v) and P(k/h) vs. air-to-air guns

ESRAVM subroutine: A(v) and P(k/h) vs. air-to-air IR missile

ESRAVS subroutine: A(v) and P(k/h) vs. low altitude SAM

CAMP subroutine to perform campaign assessment

A.1.7. Menu 8 Plotting Routine

N counter for maximum of three plot values

PKAG P(k) vs. air-to-air guns array

PKAM P(k) vs. air-to-air IR missile array

PKSM P(k) vs. low altitude SAM array

A.1.8. Other/Miscellaneous

I1 single digit integer input

I2 two digit integer input

V1 real number input

IJK integer to prevent auto-scroll

KK	general commands comparison array
K1	Main Menu comparison array
K2	Menu 2 comparison array
K3	Menu 3 comparison array
K4	Menu 4 comparison array
K5	Menu 5 comparison array
K6	Menu 6 comparison array
JJ	Menu 8 comparison array
K1Q-K9Q	branch command variables
SRFA	subroutine: alertion factor
SRFC	subroutine: chaff factor
ESRWT	subroutine: take off gross weight

A.2. ESCPLT

XO	X-axis points array
YO	lower Y-axis values
Y1	Baseline Design P(k)'s array
Y2	1st Design P(k)'s array
Y3	2nd Design P(k)'s array
IPKRAY	Legend text array

A.3. STRIKE

A.3.1. Menu 2 Design

A.3.1.1. Menu 21 Aircraft Performance Inputs

TW	thrust to weight ratio
WS	wing loading
WT	ordnance weight

B	wing span
XL	fuselage length
W	fuselage width
EC	engine face to quarter chord
ED	engine diameter
EL	engine length

A.3.1.2. Menu 22 Susceptibility Features

JAM	jammer number
IRCS	RCS reduction level
IWARN	RWR installed/not installed value
ICHAFF	chaff dispenser installed/not installed value

A.3.1.3. Menu 23 Vulnerability Features

IFS	general fuel system vulnerability value
IFV	fuel/void interface vulnerability value

A.3.2. Menu 3 Combat Scenario

A.3.2.1. Menu 31 Mission Description

XMA	mission penetration altitude
XMD	mission penetration distance
XMM	mission penetration Mach number

A.3.2.2. Menu 32 Threat Definition

AAH	air-to-air threat density
AAD	air-to-air threat diameter
SAMH	high altitude SAM threat density
SAMD	high altitude SAM threat diameter

A.3.3. Menu 4 Susceptibility Assessment

A.3.3.1. Menu 41 Probability of Detection

PDSM	P(d) by high altitude SAM
PDAR	P(d) by air-to-air IR missile

A.1.3.2. Menu 42 Probability of Hit

PHSM	P(h) by high altitude SAM
PHAR	P(h) by air-to-air IR missile

A.3.4. Menu 5 Vulnerability Assessment

A.3.4.1. Menu 51 Vulnerabla Area and Probability of Kill Given a Hit

AVAA	vulnerable area to air-to-air IR missile
PKHAA	P(k/h) by air-to-air IR missile
VASM	vulnerable area to high altitude SAM
PKHSM	P(k/h) by high altitude SAM

A.3.5. Menu 6 Survivability Assessment

A.3.5.1. Menu 61 Probability of Survival

PSSM	P(s) vs. high altitude SAM
PSAR	P(s) vs. air-to-air IR missile

A.3.5.2. Menu 62 Sortie Analysis

ACR	number of aircraft in single sortie
X1NPASS	number of targets attacked by aircraft per sortie
ACR2	number of aircraft ready for next sortie
TOTSR	total sorties flown
TOTACK	total targets attacked
TOTACL	total aircraft lost
TOTACR	total aircraft in repair at end
SORT	subroutine to perform sortie analysis

A.1.5.3. Menu 63 Campaign Analysis

ACR1	number of aircraft in campaign
XNPASS	number of targets attacked by aircraft in campaign
NSRT	number of raids in the campaign
NS	maximum number of sorties for repair

A.3.6. Menu 7 Reassessment

SSRPDA	subroutine: P(d) by air-to-air IR missile
SSRPDS	subroutine: P(d) by high altitude SAM
SSRPHR	subroutine: P(h) by air-to-air IR missile
SSRPHS	subroutine: P(h) by high altitude SAM
SSRAVA	subroutine: A(v) and P(k/h) vs. air-to-air IR missile
SSRAVS	subroutine: A(v) and P(k/h) vs. high altitude SAM
CAMP	subroutine to perform campaign assessment

A.3.7. Menu 8 Plotting Routine

N	counter for maximum of three plot values
PKSM	P(k) vs. high altitude SAM array
PKAR	P(k) vs. air-to-air IR missile

A.3.8. Other/Miscellaneous

I1	single digit integer input
I2	two digit integer input
V1	real number input
IJK	integer to prevent auto-scroll
KK	general commands comparison array
K1	Main Menu comparison array
K2	Menu 2 comparison array

K3	Menu 3 comparison array
K4	Menu 4 comparison array
K5	Menu 5 comparison array
K6	Menu 6 comparison array
JJ	Menu 8 comparison array
K1Q-K9Q	branch command variables
SRFA	subroutine: alertion factor
SRFC	subroutine: chaff factor
ESRWT	subroutine: take off gross weight

A.4. STRPLT

XO	X-axis points array
YO	lower Y-axis values
Y1	Baseline Design P(k)'s array
Y2	1st Design P(k)'s array
Y3	2nd Design P(k)'s array
IPKRAY	Legend text array
LABEL	X-axis labels array

A.5. SUPPORT

A.5.1. Menu 2 Design

A.5.1.1. Menu 21 Aircraft Performance Inputs

TW	thrust to weight ratio
WS	wing loading
WT	ordnance weight
B	wing span
XL	fuselage length

W fuselage width

ES engine separation

EC engine face to quarter chord

ED engine diameter

EL engine length

A.5.1.2. Menu 22 Susceptibility Features

JAM jammer number

IRCS RCS reduction level

IWARN RWR installed/not installed value

ICHAFF chaff dispenser installed/not installed value

A.5.1.3. Menu 23 Vulnerability Features

IFS general fuel system vulnerability value

IFV fuel/void interface vulnerability value

IFE fuel/engine interface vulnerability value

IEA engine arrangement vulnerability value

IEP engine protection vulnerability value

ICS control system vulnerability value

ICA crew arrangement vulnerability value

A.5.2. Menu 3 Combat Scenario

A.5.2.1. Menu 31 Mission Description

XMA mission loiter altitude

XMR mission radius of action

XMT mission time on station

A.5.2.2. Menu 32 Threat Definition

AAAH	AAA threat density
AAAD	AAA threat diameter
SAMH	low altitude SAM threat density
SAMD	low altitude SAM threat diameter

A.5.3. Menu 4 Susceptibility Assessment

A.5.3.1. Menu 41 Probability of Detection

PDSM	P(d) by low altitude SAM
PDAR	P(d) by AAA radar
PDAO	P(d) by AAA optical

A.5.3.2. Menu 42 Probability of Hit

PHSM	P(h) by low altitude SAM
PHR	P(h) by AAA radar
PHO	P(h) by AAA optical

A.5.4. Menu 5 Vulnerability Assessment

A.5.4.1. Menu 51 Vulnerable Area and Probability of Kill Given a Hit

VAAAA	vulnerable area to AAA
PKHAAA	P(k/h) by AAA
VASM	vulnerable area to low altitude SAM
PKHSM	P(k/h) by low altitude SAM

A.5.5. Menu 6 Survivability Assessment

A.5.5.1. Menu 61 Probability of Survival

PSSM	P(s) vs. low altitude SAM
PSAR	P(s) vs. AAA radar
PSAO	P(s) vs. AAA optical

A.5.5.2. Menu 62 Sortie Analysis

ACR	number of aircraft in single sortie
X1NPASS	number of targets attacked by aircraft per sortie
ACR2	number of aircraft ready for next sortie
TOTSR	total sorties flown
TOTACK	total targets attacked
TOTACL	total aircraft lost
TOTACR	total aircraft in repair at end
SORT	subroutine to perform sortie analysis

A.5.5.3. Menu 63 Campaign Analysis

ACR1	number of aircraft in campaign
XNPASS	number of targets attacked by aircraft in campaign
NSRT	number of raids in the campaign
NS	maximum number of sorties for repair

A.5.6. Menu 7 Reassessment

SRPDSM	subroutine: P(d) by low altitude SAM
SRPHSM	subroutine: P(h) by low altitude SAM
SRVASM	subroutine: A(v) and P(k/h) vs. low altitude SAM
SRPHR	subroutine: P(h) by AAA radar
SRPHO	subroutine: P(h) by AAA optical
SRVAAA	subroutine: A(v) and P(k/h) vs. AAA
CAMP	subroutine to perform campaign assessment

A.5.7. Menu 8 Plotting Routine

N	counter for maximum of three plot values
PKSM	P(k) vs. low altitude SAM array

PKAR	P(k) vs. AAA radar
PKAO	P(k) vs. AAA optical

A.5.8. Other/Miscellaneous

I1	single digit integer input
I2	two digit integer input
V1	real number input
IJK	integer to prevent auto-scroll
KK	general commands comparison array
K1	Main Menu comparison array
K2	Menu 2 comparison array
K3	Menu 3 comparison array
K4	Menu 4 comparison array
K5	Menu 5 comparison array
K6	Menu 6 comparison array
JJ	Menu 8 comparison array
K1Q-K9Q	branch command variables
SRFA	subroutine: alertion factor
SRFC	subroutine: chaff factor
SSRWT	subroutine: take off gross weight

A.6. SUPPLT

XO	X-axis points array
YO	lower Y-axis values
Y1	Baseline Design P(k)'s array
Y2	1st Design P(k)'s array

Y3	2nd Design P(k)'s array
IPKRAY	Legend text array
LABEL	X-axis labels array

APPENDIX B

SAMPLE INSTRUCTION MANUAL

AND ASSESSMENTS

AE 3251

AIRCRAFT COMBAT SURVIVABILITY

AIRCRAFT SURVIVABILITY DESIGN AND ASSESSMENT

USING THE

VOUGHT INTERACTIVE SURVIVABILITY ASSESSMENT PROGRAM

(VISAP)

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

INTRODUCTION

The VISAP (Vought Interactive Survivability Assessment Program) was developed at NPS to introduce the student to the survivability decisions and design tradeoffs confronting the designer/analyst of conceptual aircraft. Three specific aircraft types are examined, a Fighter Escort, a Long Range Strike aircraft, and a Close Air Support aircraft. The student is presented with several aircraft performance and design features, potential threats, and vulnerability/susceptibility parameters from which to choose for each aircraft type. Having established a baseline design (either through the default values or by individual design), the student can easily assess the effects of changing one or more design or mission descriptive parameters.

Several measures of the aircraft design's survivability are presented. These include probability of detection (P(d)), probability of hit (P(h)), and the probability of survival (P(d)) against a particular threat for each of the three types of aircraft analyzed. Comparisons of the effectiveness of each design can be obtained through repeated use of the SORTIE and CAMPAIGN analysis models incorporated in the programs. Graphs, of three designs each, may also be obtained for comparison of results.

All required inputs for the analysis are made at a computer terminal. Real time results will appear at the terminal, and hard copy results of each analysis can be sent to the on line printer. Subsequently, plots of loss rate, P(k), versus the threat types for each aircraft can be processed at an IBM 3277/Tektronix 618 dual screen terminal. throughout the analysis, default values are used for all calculations unless corrected or updated by the user.

INSTRUCTIONS

You will need the following items to estimate the survivability and effectiveness of your designs for the three types of aircraft:

1. A computer user number.
2. The ability to LOG ON and operate the IBM 3033 VM system from a a terminal.
3. This set of instructions.

The completion of the following instructions causes the VISAP program to execute. VISAP is an interactive program and is self explanatory. Please read the instructions given on the screen carefully. Failure to do so may invalidate your results and terminate the program. Please be sure to enter all variables in the format requested. You are to complete a design evaluation for each type of aircraft. The "HELP" Menus will give you useful information about the program execution and the methodology. It is recommended that you design the Fighter Escort Aircraft (ESCORT) first. It contains the most detail.

In order to access VISAP you must complete the following steps:

1. Turn the terminal on using the red toggle or pull switch on the left hand side.
2. Depress alternately the "RESET" AND "ENTER" keys until the terminal screen is cleared and the message, "CP READ", appears.
3. Enter "L XXXXP", where XXXX refers to your user number (Do not omit the blank space).

4. Enter your password.
5. Enter "CP LINK ++++P 191 195 RR", where ++++ is the user's number on whose disk the programs reside (again do not omit blank spaces).
6. Enter the password "SAP".
7. Enter "ACC 199 B".
8. Enter "VISAP". This calls the exec.
9. Choose and enter one of the aircraft types: "ESCORT", "STRIKE", or "SUPPORT".
10. After you have completed your analysis of one aircraft type, you may design another type by exiting the program and then reentering "VISAP" and choosing another type. Requesting printed results of the assessment(s) for each type can be retrieved after you exit that type.

To obtain graphs, you must utilize an IBM 3277/Tektronix 618 dual screen terminal. Follow the VISAP accession procedures, listed above, for steps 1 - 7 as before, then:

8. Enter "DISVIS". This accesses the DISSPLA programs.
9. Choose and enter one of the following: "ESCPLT", "STRPLT", or "SUPPLT" for the Escort, Strike, or Support type aircraft respectively.
10. Push the "HARD COPY" key beneath the large screen for a printout.
11. After receiving a plot for one type of aircraft, you may obtain others by pressing the "ENTER" key and reentering "DISVIS".

TASKS

You are to complete the following tasks:

1. For each type of aircraft conduct a "BASELINE" (no survivability enhancement features) assessment using the default values.
2. For each type of aircraft, select the survivability features that you want. Then conduct an assessment of that design. What is the weight penalty and how many aircraft are saved in the campaign?
3. For one type of aircraft do a sensitivity study on any three features.

   Examples:

   (a) What is the effect of jammer power on the results?

   (b) What is the effect of wing loading on the results?

   (c) What is the effect of the fuel system vulnerability reduction on the results?

   Use the plotting procedures to present your results.
4. Comment on whether your studies agree with the theory that you learned in class. Why or why not?
5. Please note any errors or difficulties that you encounter.

ESCORT INITIAL INPUTS

The following mission, aircraft, and threat parameters are used to conduct the "ESCORT" assessment:

1. Aircraft performance indicators:
   - (a) Thrust to Weight 1.0
   - (b) Wing Loading .... 70.0 lb/sq ft
   - (c) Ordnance Weight .... 4000.0 lbs
2. Mission Description:
   - (a) Mission Dash Altitude .... 10,000.00 ft
   - (b) Mission Dash Mach 0.8
   - (c) Mission Dash Distance .... 75 miles
3. Threat Definition:
   - (a) Air-to-Air Threat Density .... 0.01 wpns/sq mi
   - (b) Air-to-Air Threat Diameter .... 2.0 miles
   - (c) Air-to-Air Penetration Distance .... 150.0 miles
   - (d) Low Altitude SAM Threat Density .... 0.0017 wpns/sq mi
   - (e) Low Altitude SAM Threat Diameter .... 20.0 miles
   - (f) Low Altitude SAM Penetration Distance .. 75.0 miles
4. Sortie and Campaign Analysis:
   - (a) Initial Number of Aircraft 100
   - (b) Number of Raids in Campaign 20
   - (c) Number of Passes per Sortie 1
   - (d) Number of Sorties for Repair 4

STRIKE INITIAL INPUTS

The following Mission, Aircraft, and Threat parameters are used to conduct the "STRIKE" assessment:

1. Aircraft Performance Indicators:

   (a) Thrust to Weight 1.0

   (b) Wing Loading .... 105.0 lb/sq ft

   (c) Ordnance Weight .... 4000.0 lbs

2. Missions Description:

   (a) Mission Penetration Distance .... 200.0 miles

   (b) Mission Penetration Altitude .... 40000.0 ft

   (c) Mission Penetration Mach 1.8

3. Threat Definition:

   (a) Air-to-Air Threat Density .... 0.01 wpns/sq mi

   (b) Air-to-Air Threat Diameter .... 4.0 miles

   (c) High Altitude SAM Threat Density .... 0.0017 wpns/sq mi

   (d) High Altitude SAM Threat Diameter .... 20.0 miles

4. Sortie and Campaign Analysis:

   (a) Initial Number of Aircraft 100

   (b) Number of Raids in Campaign 20

   (c) Number of Passes per Sortie 1

   (d) Number of Sorties for Repair 4

SUPPORT INITIAL INPUTS

The following Mission, Aircraft, and Threat Parameters are used to conduct the "SUPPORT" assessment:

1. Aircraft Performance Indicators:

   (a) Thrust to Weight 0.55

   (b) Wing Loading .... 90.0 lb/sq ft

   (c) Ordnance Weight .... 8000.0 lbs

2. Mission Description:

   (a) Mission Radius of Action .... 150.0 miles

   (b) Mission Loiter Altitude .... 10000.0 ft

   (c) Mission Time on Station .... 60.0 min

3. Threat Definition:

   (a) AAA Threat Density .... 0.01 wpns/sq mi

   (b) AAA Threat Diameter .... 3.0 miles

   (c) Low Altitude SAM Threat Density .... 0.0017 wpns/sq mi

   (d) Low Altitude SAM Threat Diameter .... 20.0 miles

4. Sortie and Campaign Analysis:

   (a) Initial Number of Aircraft 100

   (b) Number of Raids in Campaign 20

   (c) Number of Passes per Sortie 1

   (d) Number of Sorties for Repair 4

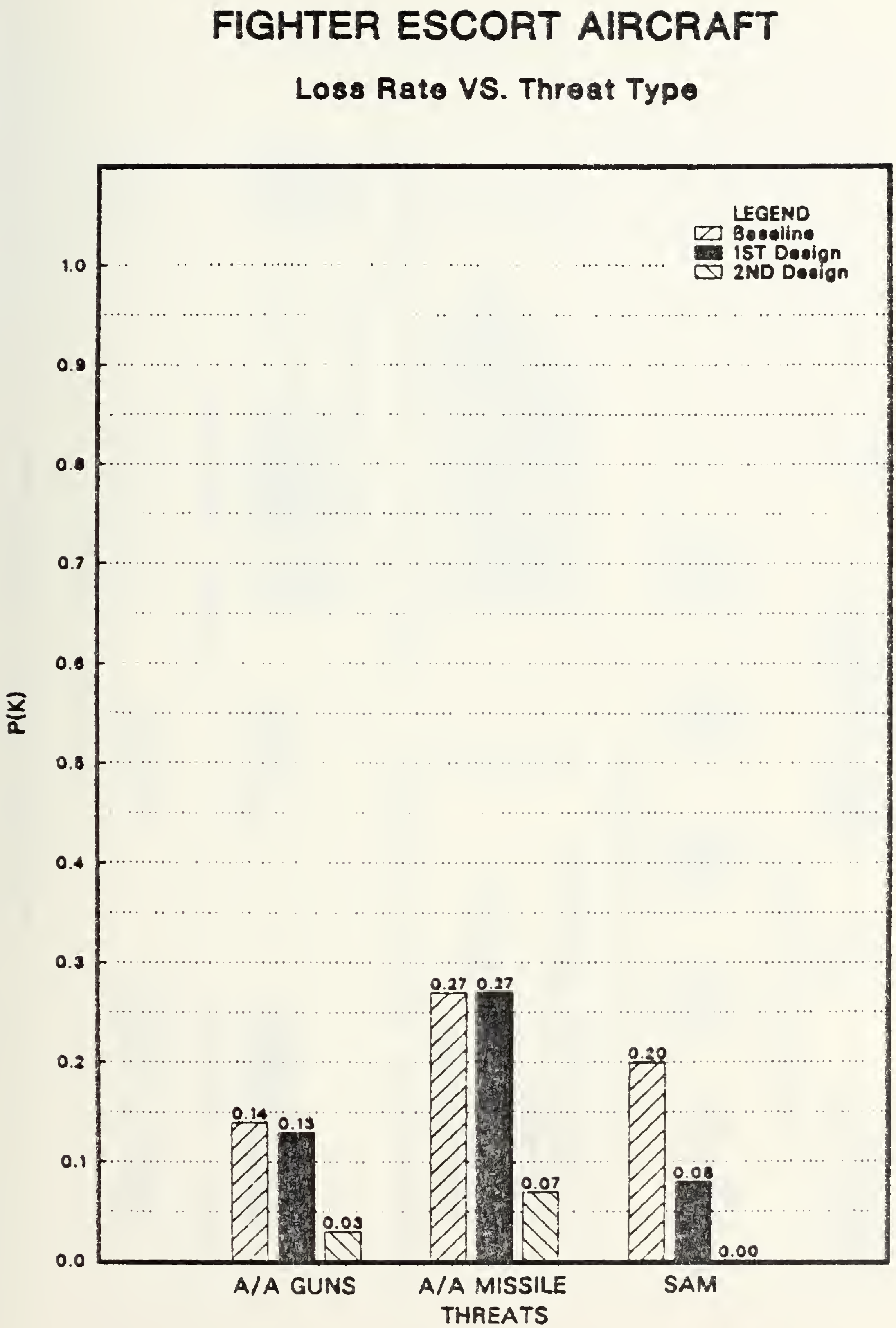

Figure 2. Sample Escort Plot

```
                   ** FIGHTER ESCORT AIRCRAFT **

                      * PERFORMANCE FEATURES

      THRUST TO WEIGHT            1.00       WING LOADING             70.00
      ORDNANCE WEIGHT          4000.00

  * MISSION PARAMETERS                    * THREAT PARAMETERS

      DASH ALTITUDE           10000.00       A/A DENSITY               0.01
      DASH MACH NBR.              0.80       A/A DIAMETER              2.00
      DASH DISTANCE              75.00       A/A PENETRATION DIST    150.00
                                             SAM DENSITY               0.00
                                             SAM DIAMETER             20.00
                                             SAM PENETRATION DIST     75.00

  * SUSCEPTIBILITY REDUCTION FEATURES   * VULNERABILITY  REDUCTION FEATURES

      JAMMER NUMBER                  0       FUEL SYSTEM GENERAL       1
      RCS REDUCTION LEVEL            0       FUEL/VOID INTERFACE       1
      RADAR WARNING RECEIVER         0       FUEL/ENGINE INTERFACE     1
      CHAFF DISPENSER                0       ENGINE ARRANGEMENT        1
      IR JAMMER                      0       ENGINE PROTECTION         1
      IR FLARE DISPENSER             0       CONTROL SYSTEM            1
      IR SUPPRESSION TECHNIQUE       0       CREW ARRANGMENT           1

         * SURVIVABILITY ASSESSMENT:

                   P(S)      P(D)      P(H)      P(K/H)
   VS A/A GUNS     0.86      1.00      0.86      0.17
   VS A/A MISS     0.73      1.00      0.41      0.68
   VS SAM          0.80      1.00      0.20      0.99

         * CAMPAIGN ANALYSIS:

   INITIAL A/C        100.     NUMBER OF RAIDS          20
   PASSES/SORTIE        1.     SORTIES FOR REPAIR     4
   A/C READY           43.     TOTAL SORTIES        1294.
   TOTAL TARGETS     1233.     TOTAL A/C LOST         49.
   IN REPAIR            8.

   BASELINE TOGW   47932.01          ENHANCED TOGW   47932.01
```

Figure 3. Sample Escort Baseline Output

```
                    ** FIGHTER ESCORT AIRCRAFT **

                       * PERFORMANCE FEATURES

     THRUST TO WEIGHT           1.2C        WING LOADING            70.00
     ORDNANCE WEIGHT         4000.00

 * MISSION PARAMETERS                   * THREAT PARAMETERS

     DASH ALTITUDE          15000.00        A/A DENSITY              0.02
     DASH MACH NBR.             0.80        A/A DIAMETER             2.00
     DASH DISTANCE             75.0C        A/A PENETRATION DIST   150.00
                                            SAM DENSITY              0.00
                                            SAM DIAMETER            20.00
                                            SAM PENETRATION DIST    75.00

 * SUSCEPTIBILITY REDUCTICN FEATURES   * VULNERABILITY  REDUCTION FEATURES

     JAMMER NUMBER                 5        FUEL SYSTEM GENERAL      8
     RCS REDUCTION LEVEL           0        FUEL/VOID INTERFACE      1
     RADAR WARNING RECEIVER        0        FUEL/ENGINE INTERFACE    1
     CHAFF DISPENSER               0        ENGINE ARRANGEMENT       1
     IR JAMMER                     0        ENGINE PROTECTION        1
     IR FLARE DISPENSER            0        CONTROL SYSTEM           1
     IR SUPPRESSICN TECHNIQUE      0        CREW ARRANGMENT          1

        * SURVIVABILITY ASSESSMENT:

                  P(S)     P(D)     P(H)     P(K/H)
  VS A/A GUNS     C.87     1.00     0.86     0.15
  VS A/A MISS     C.73     1.00     0.40     0.67
  VS SAM          C.92     0.95     0.09     0.93

        * CAMPAIGN ANALYSIS:

  INITIAL A/C        10C.    NUMBER CF RAIDS        20
  PASSES/SORTIE        1.    SORTIES FOR REPAIR    4
  A/C READY           31.    TOTAL SCRTIES       1065.
  TOTAL TARGETS      976.    TOTAL A/C LCST        57.
  IN REPAIR           12.

  BASELINE TOGW   51861.88        ENHANCED TOGW   56990.67
```

Figure 4. Sample Escort 1st Design Output

```
                         ** FIGHTER ESCORT AIRCRAFT **

                            * PERFORMANCE FEATURES

     THRUST TO WEIGHT              1.20      WING LOADING              80.00
     ORDNANCE WEIGHT           10000.00

 * MISSION PARAMETERS                     * THREAT PARAMETERS

     DASH ALTITUDE             15000.00      A/A DENSITY                0.02
     DASH MACH NBR.                1.20      A/A DIAMETER               5.00
     DASH DISTANCE               100.00      A/A PENETRATION DIST     100.00
                                             SAM DENSITY                0.00
                                             SAM DIAMETER              25.00
                                             SAM PENETRATION DIST     100.00

 * SUSCEPTIBILITY REDUCTION FEATURES     * VULNERABILITY  REDUCTION FEATURE

     JAMMER NUMBER                   5       FUEL SYSTEM GENERAL        8
     RCS REDUCTION LEVEL             6       FUEL/VOID INTERFACE        6
     RADAR WARNING RECEIVER          1       FUEL/ENGINE INTERFACE      8
     CHAFF DISPENSER                 1       ENGINE ARRANGEMENT         2
     IR JAMMER                       1       ENGINE PROTECTION          2
     IR FLARE DISPENSER              1       CONTROL SYSTEM             5
     IR SUPPRESSION TECHNIQUE        2       CREW ARRANGMENT            6

        * SURVIVABILITY ASSESSMENT:

                   P(S)      P(D)      P(H)      P(K/H)
  VS A/A GUNS      0.97      1.00      0.92      0.03
  VS A/A MISS      0.93      1.00      0.17      0.42
  VS SAM           1.00      0.10      0.00      0.29

        * CAMPAIGN ANALYSIS:

  INITIAL A/C        100.     NUMBER OF RAIDS          20
  PASSES/SORTIE        1.     SORTIES FOR REPAIR      4
  A/C READY           49.     TOTAL SORTIES         1202.
  TOTAL TARGETS     1070.     TOTAL A/C LOST          22.
  IN REPAIR           29.

  BASELINE TOGW   57463.81         ENHANCED TOGW   84619.50
```

Figure 5. Sample Escort 2nd Design Output

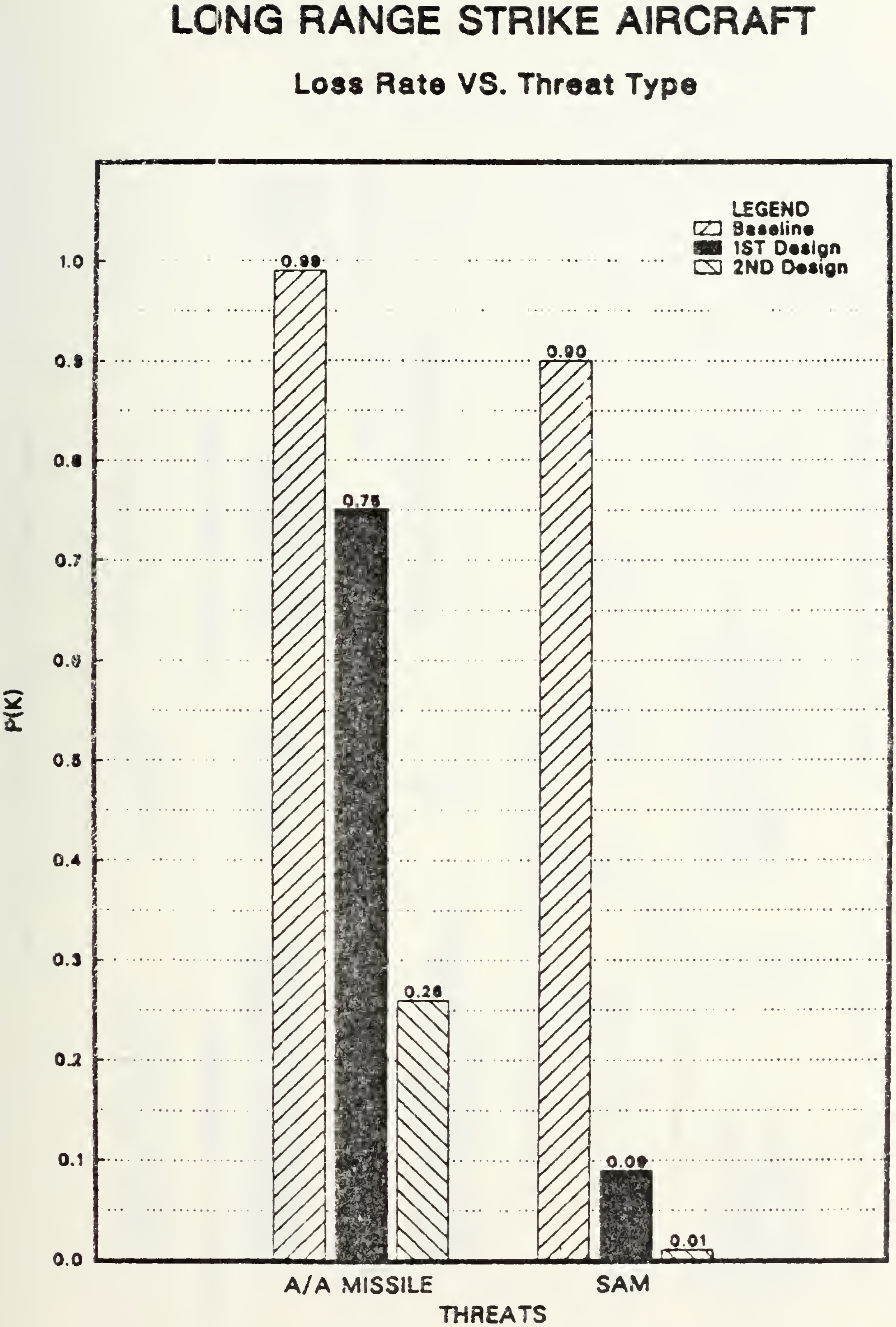

Figure 6. Sample Strike Plot

```
                      ** LONG RANGE STRIKE AIRCRAFT **

                        * PERFORMANCE FEATURES

    THRUST TO WEIGHT                1.00      WING LOADING            105.00
    ORDNANCE WEIGHT              4000.00

 * MISSION PARAMETERS                      * THREAT PARAMETERS

    PENETRATION DISTANCE          200.00      A/A DENSITY               0.01
    PENETRATION ALTITUDE        40000.00      A/A DIAMETER              4.00
    PENETRATION MACH NBR.           1.80      SAM DENSITY               0.00
                                              SAM DIAMETER             20.00

 * SUSCEPTIBILITY REDUCTION FEATURES     * VULNERABILITY  REDUCTION FEATURES

    JAMMER NUMBER                 0           FUEL SYSTEM GENERAL     1
    RCS REDUCTION LEVEL           0           FUEL/VOID INTERFACE     1
    RADAR WARNING RECEIVER        0
    CHAFF DISPENSER               0

       * SURVIVABILITY ASSESSESSMENT:

                  P(S)     P(D)     P(H)     P(K/H)
 VS A/A MISSILE   0.01     0.99     1.00     1.00
 VS HIGH ALT SAM  0.10     0.99     0.91     1.00

       * CAMPAIGN ANALYSIS:

 INITIAL A/C       100.     NUMBER OF RAIDS         20
 PASSES/SORTIE       1.     SORTIES FOR REPAIR     4
 A/C READY           0.     TOTAL SORTIES          155.
 TOTAL TARGETS      92.     TOTAL A/C LOST         100.
 IN REPAIR           0.

 BASELINE TOGW   64071.66         ENHANCED TOGW   64071.66
```

Figure 7. Sample Strike Baseline Output

```
                 ** LONG RANGE STRIKE AIRCRAFT **

                      * PERFORMANCE FEATURES

    THRUST TO WEIGHT          1.20     WING LOADING            105.00
    ORDNANCE WEIGHT        4000.00

 * MISSION PARAMETERS                 * THREAT PARAMETERS

    PENETRATION DISTANCE   1000.00     A/A DENSITY               0.02
    PENETRATION ALTITUDE  40000.00     A/A DIAMETER              4.00
    PENETRATION MACH NBR.     1.80     SAM DENSITY               0.00
                                       SAM DIAMETER             20.00

 * SUSCEPTIBILITY REDUCTION FEATURES  * VULNERABILITY  REDUCTION FEATURES

    JAMMER NUMBER                5     FUEL SYSTEM GENERAL     4
    RCS REDUCTION LEVEL          0     FUEL/VOID INTERFACE     1
    RADAR WARNING RECEIVER       0
    CHAFF DISPENSER              0

        * SURVIVABILITY ASSESSESSMENT:

                 P(S)      P(D)      P(H)      P(K/H)
 VS A/A MISSILE  0.25      0.76      1.00      0.98
 VS HIGH ALT SAM 0.91      0.10      0.91      0.99

        * CAMPAIGN ANALYSIS:

 INITIAL A/C       100.    NUMBER OF RAIDS        20
 PASSES/SORTIE       1.    SORTIES FOR REPAIR    4
 A/C READY           0.    TOTAL SORTIES         113.
 TOTAL TARGETS      35.    TOTAL A/C LOST        100.
 IN REPAIR           0.

 BASELINE TOGW  146325.19        ENHANCED TOGW 159213.56
```

Figure 8. Sample Strike 1st Design Output

```
                    ** LCNG RANGE STRIKE AIRCRAFT **

                        * PERFORMANCE FEATURES

     THRUST TO WEIGHT                1.20       WING LOADING            120.00
     ORDNANCE WEIGHT             14000.00

 * MISSION PARAMETERS                       * THREAT PARAMETERS

     PENETRATION CISTANCE         1000.00       A/A DENSITY               0.02
     PENETRATION ALTITUDE        60000.00       A/A DIAMETER              5.00
     PENETRATION MACH NBR.           2.20       SAM DENSITY               0.00
                                                SAM DIAMETER             25.00

 * SUSCEPTIBILITY REDUCTICN FEATURES       * VULNERABILITY  REDUCTION FEATURES

     JAMMER NUMBER                      5       FUEL SYSTEM GENERAL     4
     RCS REDUCTION LEVEL                8       FUEL/VOID INTERFACE     6
     RADAR WARNING RECEIVER             1
     CHAFF CISPENSER                    1

          * SURVIVABILITY ASSESSESSMENT:

                  P(S)      P(D)      P(H)      P(K/H)
 VS A/A MISSILE   0.74      0.76      0.40      0.88
 VS HIGH ALT SAM  0.99      0.10      0.19      0.47

          * CAMPAIGN ANALYSIS:

 INITIAL A/C         100.     NUMBER CF RAIDS          20
 PASSES/SORTIE         1.     SORTIES FOR REPAIR     4
 A/C READY             0.     TOTAL SCRTIES          221.
 TOTAL TARGETS       153.     TOTAL A/C LCST         100.
 IN REPAIR             0.

 BASELINE TCGW   200446.50          ENHANCED TCGW 224027.69
```

Figure 9. Sample Strike 2nd Design Output

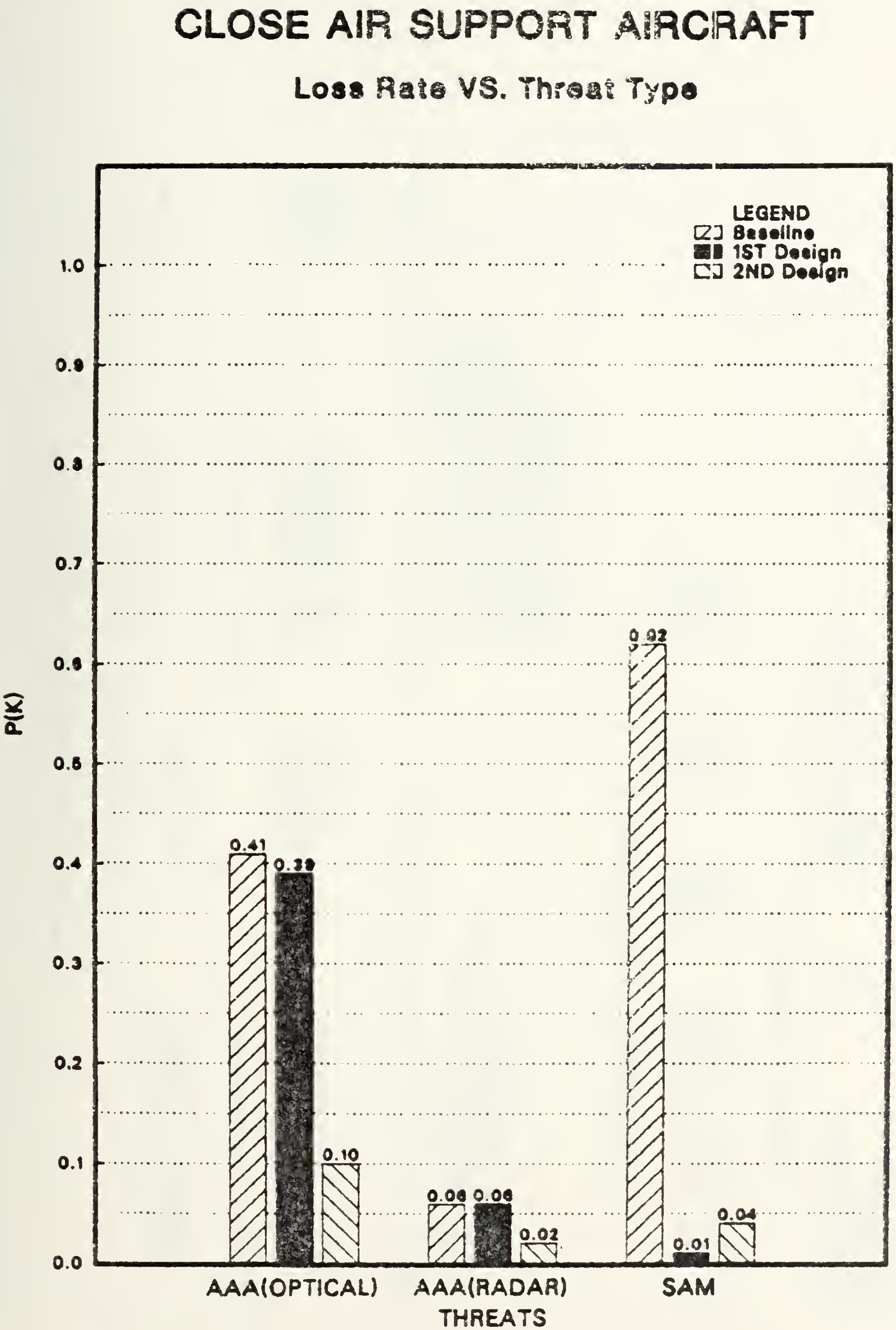

Figure 10. Sample Support Plot

```
                    ** CLOSE AIR SUPPORT AIRCRAFT **

                         * PERFORMANCE FEATURES

    THRUST TO WEIGHT             0.55     WING LOADING              90.00
    ORDNANCE WEIGHT           8000.00

* MISSION PARAMETERS                   * THREAT PARAMETERS

    RADIUS OF ACTION           150.00     AAA DENSITY                0.01
    LOITER ALTITUDE          10000.00     AAA DIAMETER               3.00
    TIME ON STATION             60.00     SAM DENSITY                0.00
                                          SAM DIAMETER              20.00

* SUSCEPTIBILITY REDUCTION FEATURES   * VULNERABILITY  REDUCTION FEATURES

    JAMMER NUMBER                  0      FUEL SYSTEM GENERAL       1
    RCS REDUCTION LEVEL            0      FUEL/VOID INTERFACE       1
    RADAR WARNING RECEIVER         0      FUEL/ENGINE INTERFACE     1
    CHAFF DISPENSER                0      ENGINE ARRANGEMENT        1
                                          ENGINE PROTECTION         1
                                          CONTROL SYSTEM            1
                                          CREW ARRANGMENT           1

      * SURVIVABILITY ASSESSMENT:

                    P(S)      P(D)      P(H)      P(K/H)
  VS AAA OPTICAL    0.94      1.00      0.14      0.45
  VS AAA RADAR      0.59      1.00      0.90      0.45
  VS SAM            0.38      1.00      0.13      1.00

      * CAMPAIGN ANALYSIS:

  INITIAL A/C        100.     NUMBER OF RAIDS          20
  PASSES/SORTIE        1.     SORTIES FOR REPAIR      4
  A/C READY           30.     TOTAL SORTIES         1103.
  TOTAL TARGETS     1039.     TOTAL A/C LOST          65.
  IN REPAIR            6.

  BASELINE TOGW   28945.09          ENHANCED TOGW   28945.09
```

Figure 11. Sample Support Baseline Output

```
                    ** CLOSE AIR SUPPCRT AIRCRAFT **

                        * PERFORMANCE FEATURES

     THRUST TO WEIGHT          0.65      WING LOADING            90.00
     ORDNANCE WEIGHT        8000.00

 * MISSION PARAMETERS                   * THREAT PARAMETERS

     RADIUS CF ACTION        300.0C      AAA DENSITY              0.02
     LCITER ALTITUCE       10000.00      AAA DIAMETER             3.00
     TIME ON STATICN          60.00      SAM DENSITY              0.00
                                         SAM DIAMETER            20.00

 * SUSCEPTIBILITY REDUCTICN FEATURES   * VULNERABILITY  REDUCTION FEATURES

     JAMMER NUMBER                5      FUEL SYSTEM GENERAL      8
     RCS RECUCTION LEVEL          0      FUEL/VCID INTERFACE      1
     RADAR WARNING RECEIVER       0      FUEL/ENGINE INTERFACE    1
     CHAFF CISPENSER              0      ENGINE ARRANGEMENT       1
                                         ENGINE PROTECTION        1
                                         CCNTROL SYSTEM           1
                                         CREW ARRANGMENT          1

       * SURVIVABILITY ASSESSMENT:

               P(S)     P(D)     P(H)     P(K/H)
 VS AAA OPTICAL C.94     1.00     0.14     0.44
 VS AAA RACAR   0.61     1.00     0.89     0.44
 VS SAM         C.99     0.97     0.01     0.98

       * CAMPAIGN ANALYSIS:

 INITIAL A/C       100.    NUMBER OF RAIDS        20
 PASSES/SORTIE       1.    SORTIES FOR REPAIR    4
 A/C READY          97.    TOTAL SCRTIES       1975.
 TOTAL TARGETS    1974.    TOTAL A/C LCST         3.
 IN REPAIR           0.

 BASELINE TOGW   32200.62        ENHANCED TOGW   34886.78
```

Figure 12. Sample Support 1st Design Output

```
                    ** CLOSE AIR SUPPCRT AIRCRAFT **

                        * PERFORMANCE FEATURES

    THRUST TO WEIGHT            0.65       WING LOADING           100.00
    ORDNANCE WEIGHT         10000.00

 * MISSION PARAMETERS                     * THREAT PARAMETERS

    RADIUS OF ACTION          300.00       AAA DENSITY              0.02
    LCITER ALTITUCE          9000.00       AAA DIAMETER             5.00
    TIME ON STATICN           120.00       SAM DENSITY              0.00
                                           SAM DIAMETER            25.00

 * SUSCEPTIBILITY REDUCTICN FEATURES    * VULNERABILITY  REDUCTION FEATURES

    JAMMER NUMBER                  5       FUEL SYSTEM GENERAL      8
    RCS REDUCTION LEVEL            3       FUEL/VCID INTERFACE      6
    RADAR WARNING RECEIVER         1       FUEL/ENGINE INTERFACE    8
    CHAFF CISPENSER                1       ENGINE ARRANGEMENT       2
                                           ENGINE PROTECTION        2
                                           CCNTROL SYSTEM           5
                                           CREW ARRANGMENT          6

        * SURVIVABILITY ASSESSMENT:

                  P(S)      P(D)      P(H)      P(K/H)
  VS AAA OPTICAL  C.98      1.00      0.14      C.11
  VS AAA RACAR    C.90      1.00      0.90      0.11
  VS SAM          C.96      0.94      0.21      0.18

        * CAMPAIGN ANALYSIS:

  INITIAL A/C        10C.     NUMBER OF RAIDS          20
  PASSES/SORTIE        1.     SORTIES FOR REPAIR      4
  A/C READY           72.     TOTAL SORTIES        1632.
  TOTAL TARGETS     1583.     TOTAL A/C LCST          18.
  IN REPAIR           11.

  BASELINE TCGW   40858.48         ENHANCED TCGW   46643.16
```

Figure 13. Sample Support 2nd Design Output

APPENDIX C

FLOW CHARTS

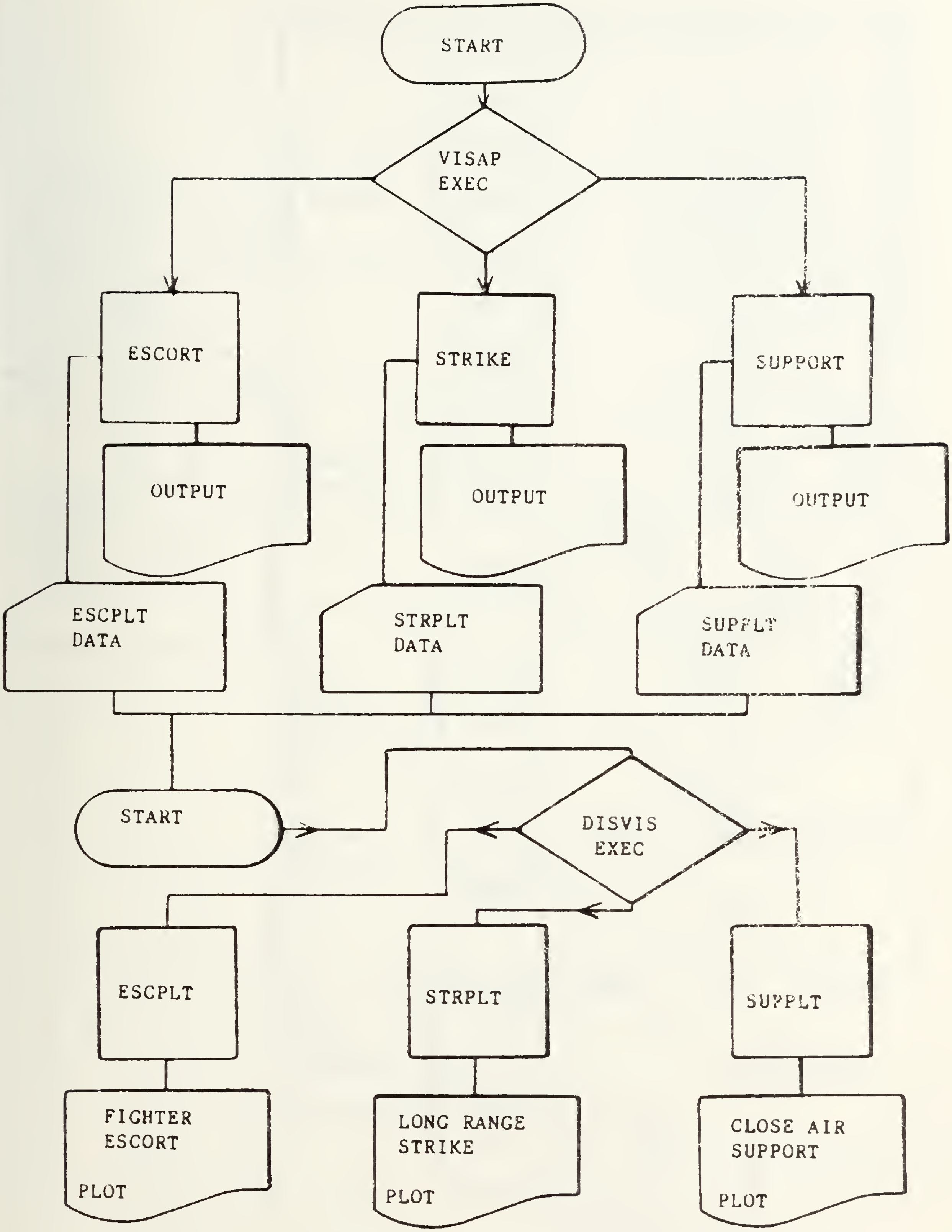

Figure 14. External Program Flow Chart

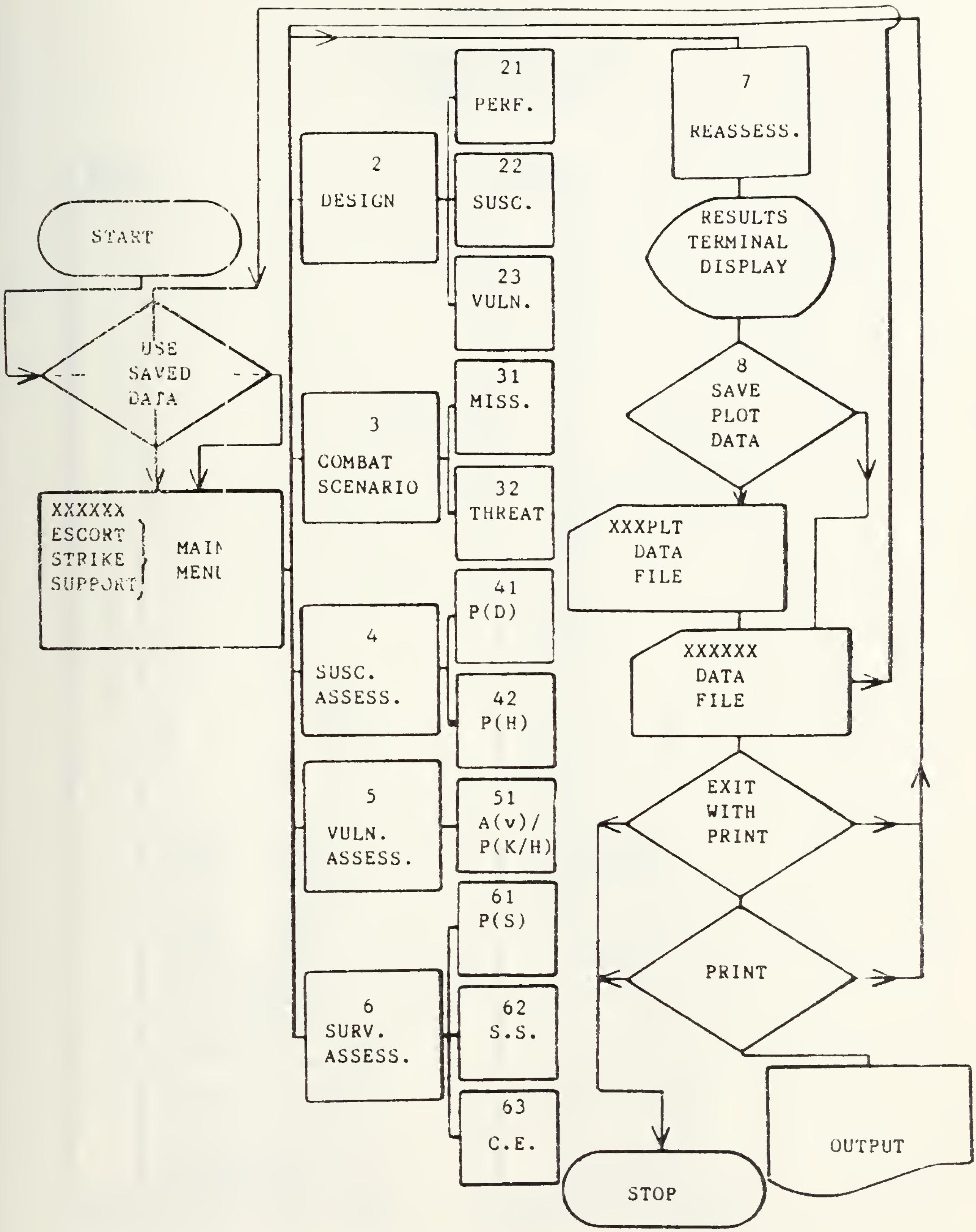

Figure 15. Internal Program Flow Chart

APPENDIX D

VISAP AND DISVIS EXECS
PROGRAM LISTINGS

```
C***********************************************************************
C**                                                                   **
C**     CMS EXEC TO CONTROL VISAP OPERATION                           **
C**                                                                   **
C***********************************************************************
GLOBAL TXTLIB CMSLIB FORTMOD2 MOD2EEH NONIMSL IMSLSP
FILEDEF 01 DISK ESCORT DATA
FILEDEF 02 DISK STRIKE DATA
FILEDEF 03 DISK SUPPORT DATA
FILEDEF 04 TERMINAL
FILEDEF 06 PRINTER
FILEDEF 07 DISK ESCPLT DATA
FILEDEF 08 DISK STRPLT DATA
FILEDEF 09 DISK SUPPLT DATA
&TYPE ENTER STRIKE, ESCORT, OR SUPPORT
&READ VARS &1
LOAD &1 (START
&END
```

```
C***********************************************************************
C**                                                                   **
C**     CMS EXEC TO CONTROL PLOTTING REQUESTS                         **
C**                                                                   **
C***********************************************************************
GLOBAL TXTLIB CMSLIB FORTMOD2 MOD2EEH NONIMSL IMSLSP
FILEDEF 07 DISK ESCPLT DATA
FILEDEF 08 DISK STRPLT DATA
FILEDEF 09 DISK SUPPLT DATA
&TYPE ENTER STRPLT, ESCPLT, OR SUPPLT
&READ VARS &1
EXEC DISSPLA &1 (START
&END
```

APPENDIX E

ESCORT AND ESCPLT
PROGRAM LISTINGS

```
C***************************************************************************
C**                                                                       **
C**     ESCCRT                                                            **
C**     PROGRAM TC ASSESS FIGHTER ESCORT AIRCRAFT SURVIVABILITY**
C**                                                                       **
C***************************************************************************
C
C          FIGHTER ESCORT
C
C THESE LINE NUMBERS ARE FOR EASY REFERENCE
C          MAIN MENU                               1, 100, 1001
C          AIRCRAFT DESIGN SELECTION                 2, 110, 1110
C              A/C PERFORMANCE INDICATORS           21, 210, 1210
C              SUSCEPTIBILITY FEATURES               22, 220, 1220
C                   JAMMERS 221  RCS 222  RWR 223
C                   CHAFF 224 IRJAM 225 IRFLAR 226 IRSUP 227
C              VULNERABILITY FEATURES               23, 230, 1230
C          COMBAT SCENARIO SELECTION                 3, 120, 1120
C              MISSION PROFILE                      31, 310, 1310
C              THREAT SELECTICN                     32, 320, 1320
C          SUSCEPTIBILITY ASSESMENT                  4, 130, 1130
C              PROBABILITY OF DETECTICN             41, 410, 1410
C              PROBABILITY OF HIT                   42, 420, 1420
C                   VS A/A GUN                          421
C                   VS A/A IR MISSILE                   422
C                   VS LOW ALT SAM                      423
C          VULNERABILITY ASSESMENT                5, 140, 1140
C                   VS A/A GUN                          510
C                   VS A/A IR MISSILE                   520
C                   VS SAM                              530
C          SURVIVABILITY ASSESMENT                  6, 150, 1150
C              P(S) 1:1 A/A GUN                         610, 618
C              P(S) 1:1 A/A IR MISSILE                  620, 628
C              P(S) 1:1 LOW ALT SAM                     630, 638
C              SINGLE SCRTIE                            640, 1640
C              CAMPAIGN EVALUATION                      650, 1650
C          HELP                                         997X
C          TRANFER                                      998
C          EXIT                                         999
C
      IMPLICIT REAL*4(A-H,O-Z),INTEGER*4(I-N)
C
      DIMENSION KK(4),K1(6),K2(3),K3(2),K4(2),K5(3),K6(5),
C-  #5 ---------------------------------------------------------------------
     *          JJ(2),PKAG(3),PKAM(3),PKSM(3)
C
      DATA K1/'DE','MS','SA','VA','SV','MM'/
      DATA K2/'AP','SF','VF'/
```

```
      DATA K3/'MP','TH'/
      DATA K4/'PD','PH'/
      DATA K5/'KG','KM','KD'/
      DATA K6/'AG','AM','LS','SS','CE'/
      DATA KK/'HP','TN','EX','RT'/
C- #5 -----------------------------------------------------------------
      DATA JJ/'Y','N'/
C- #3 -----------------------------------------------------------------
C*********** TO SAVE DATA ****************************************
      CALL FRTCMS('CLRSCRN ')
      WRITE(4,1010)
1010  FORMAT(' ','DATA MODE SELECTION, ENTER A CODE AS FOLLOWS:'//
     *T6,'IF THIS IS YOUR FIRST TIME THROUGH ESCORT OR IF YOU WISH'/
     *T6,'TO USE THE DEFAULT VALUES/PARAMETERS ENTER...0 '//
     *T6,'TO USE DATA SAVED FROM YOUR LAST RUN ENTER...1 '///
     *T20,'WARNING'//
     *T6,'--DO NOT ENTER 1 IF THIS IS YOUR FIRST RUN OR IF YOU HAVE'/
     *T6,'ERASED YOUR ESCORT DATA FILE FROM YOUR DISK--'/)
      READ(4,1011)I1
1011  FORMAT(I1)
      IF(I1.EQ.0)GO TO 1021
      IF(I1.EQ.1)GO TO 1022
1022  CONTINUE
      REWIND 1
      READ(1,1012)TW,WS,WT,B,XL,W,EC,ED,EL,DL,JAM,IRCS,IWARN,ICHAFF,
     *      IRJAM,IRFLAR,IRSUP,IFS,
     *      IFV,IFE,IEA,IEP,ICS,ICA,XMDA,XMDM,XMDD,AAH,AAD,AAL,SAMH,
     *      SAMD,SAML,PDAAG,PDAAM,PDSM,PHG,PHM,PHSM,APAAG,AVAAG,
     *      PKHAAG,AVAAM,PKHAAM,VASM,PKHSM,
     *      PSAG,PSAM,PSSM,ACR,ACR1,NSRT,
     *      XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR,BLTOGW,TOGW
1012  FORMAT(' ',5G12.4)
      GO TO 1
C*****************************************************************
1021  CONTINUE
      DATA TW/1./,WS/70./,WT/4000./,B/26./,XL/36./,W/5.5/,EC/5.5/,ED/2.0
     &/, EL/11./,DL/8./
      DATA JAM/0/,IRCS/0/,IWARN/0/,ICHAFF/0/,IRJAM/0/,IRFLAR/0/,IRSUP/0/
      DATA IFS/1/,IFV/1/,IFE/1/,IEA/1/,IEP/1/,ICS/1/,ICA/1/
      DATA XMDA/10000./,XMDM/.8/,XMDD/75./
      DATA AAH/.01/,AAD/2./,AAL/150./,SAMH/.0017/,SAMD/20./,SAML/75./
      DATA PDAAG/1./,PDAAM/1./,PDSM/.9988/
      DATA PHG/.8625/,PHM/.4052/,PHSM/.2/
      DATA APAAG/604./,AVAAG/100./,PKHAAG/.1657/,AVAAM/408./,
     &PKHAAM/.675/,VASM/600./,PKHSM/.9934/
      DATA PSAG/.8571/,PSAM/.7265/,PSSM/.8016/
      DATA ACR/100./
C- #3 -----------------------------------------------------------------
```

```
      DATA ACR1/100./,NSRT/20/,XNPASS/1./,NS/4/
      DATA ACR2/43.25/,TOTSR/1293.62/,TOTACK/1232.79/,TOTACL/48.71/
      DATA TCTACR/8.04/,BLTOGW/47932.01/,TOGW/47932.01/
C- #5 ----------------------------------------------------------------
      DATA N/0/
C*********************************************************************
C     MAIN MENU DISPLAY
C*********************************************************************
100       CCNTINUE
1         CCNTINUE
        CALL FRTCMS('CLRSCRN ')
      WRITE(4,1001)
1001  FORMAT(' ','ESCCRT MENU (1) SELECT A CODE AS FOLLOWS:'//
     +T6,'FCR AN EXPLANATION               ',T41,'HP'/
     +T6,'AIRCRAFT DESIGN SELECTION        ',T41,'DE'/
     +T6,'COMBAT SCENARIO SELECTION        ',T41,'MS'/
     +T6,'SUSCEPTIBILITY ASSESSMENT        ',T41,'SA'/
     +T6,'VULNERABILITY ASSESSMENT         ',T41,'VA'/
     +T6,'SURVIVABILITY ASSESSMENT         ',T41,'SV'/
     +T6,'TO TRANSFER TO OTHER MENUS       ',T41,'TN'/
     +T6,'TC EXIT CR PRINT RESULTS         ',T41,'EX'/)
      READ(5,2000) K1C
2000  FORMAT(A4)
      IF(K1Q.EQ.K1(1)) GO TO 110
      IF(K1C.EQ.K1(2)) GC TC 120
      IF(K1C.EQ.K1(3)) GO TO 130
      IF(K1Q.EQ.K1(4)) GO TC 140
      IF(K1Q.EQ.K1(5)) GO TO 150
      IF(K1Q.EQ.KK(1)) GO TC 9971
      IF(K1C.EQ.KK(2)) GO TC 998
C- #3 ----------------------------------------------------------------
      IF(K1C.EQ.KK(3)) GC TC 1061
      WRITE(4,120C)
1200  FORMAT(' ','INPUT ERRCR. REPEAT INPUT')
      GO TO 1
C*********************************************************************
C     MENU 2  DESIGN
C*********************************************************************
110     CALL FRTCMS('CLRSCRN ')
2         CCNTINUE
      WRITE(4,1110)
1110  FORMAT(' ','MENU (2) DESIGN,  ENTER  A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION                        ',T51,'HP'/
     +T6,'A/C PERFCRMANCE INDICATORS                ',T51,'AP'/
     +T6,'SUSCEPTIBILITY FEATURES                   ',T51,'SF'/
     +T6,'VULNERABILITY FEATURES                    ',T51,'VF'/
     +T6,'TO RETURN TC MENU (1)                     ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS                ',T51,'TN'/)
```

```
      READ(5,2000) K2Q
      IF(K2Q.EQ.K2(1)) GO TO 210
      IF(K2Q.EQ.K2(2)) GO TO 220
      IF(K2Q.EQ.K2(3)) GO TO 230
      IF(K2Q.EQ.KK(1)) GO TO 9972
      IF(K2Q.EQ.KK(2)) GO TO 998
C- #3 ----------------------------------------------------------------------
      IF(K2Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 2
C*****************************************************************
C     MENU 3  COMBAT SCENARIO
C*****************************************************************
120       CALL FRTCMS('CLRSCRN ')
3           CONTINUE
      WRITE(4,1120)
1120  FORMAT(' ','MENU (3) COMBAT SCENARIO, ENTER  A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T51,'HP'/
     +T6,'MISSION PROFILE                 ',T51,'MP'/
     +T6,'THREAT SELECTION                ',T51,'TH'/
     +T6,'TO RETURN TO MENU (1)           ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS      ',T51,'TN'/)
      READ(5,2000) K3Q
      IF(K3Q.EQ.K3(1)) GO TO 310
      IF(K3Q.EQ.K3(2)) GO TO 320
      IF(K3Q.EQ.KK(1)) GO TO 9973
      IF(K3Q.EQ.KK(2)) GO TO 998
C- #3 ----------------------------------------------------------------------
      IF(K3Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 3
C*****************************************************************
C MENU 4  SUSCEPTIBILITY ASSESSMENT
C*****************************************************************
130       CALL FRTCMS('CLRSCRN ')
4           CONTINUE
      WRITE(4,1130)
1130  FORMAT(' ','MENU (4) SUSCEPTIBILITY ASSESSMENT'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T41,'HP'/
     +T6,'PROBABILITY OF DETECTION        ',T41,'PD'/
     +T6,'PROBABILITY OF HIT              ',T41,'PH'/
     +T6,'TO RETURN TO MENU (1)           ',T41,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS      ',T41,'TN'/)
      READ(5,2000) K4Q
      IF(K4Q.EQ.K4(1)) GO TO 410
      IF(K4Q.EQ.K4(2)) GO TO 420
      IF(K4Q.EQ.KK(1)) GO TO 9974
```

```
      IF(K4Q.EQ.KK(2)) GC TC 998
C- #3 -------------------------------------------------------------------
      IF(K4Q.EQ.KK(4)) GC TC 7
      WRITE(4,1200)
      GO TO 4
C***********************************************************************
C MENU 5  VULNERABILITY ASSESSMENT
C***********************************************************************
140       CALL FRTCMS('CLRSCRN ')
5           CONTINUE
      WRITE(4,1140)
1140  FORMAT(' ','MENU (5)  VULNERABILITY ASSESSMENT'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T41,'HP'/
     +T6,'VULN AREA & P(K/H) VS A/A GUN',T41,'KG'/
     +T6,'VULN AREA & P(K/D) VS A/A MISSILE',T41,'KM'/
     +T6,'VULN AREA & P(K/D) VS SAM      ',T41,'KD'/
     +T6,'TO RETURN TO MENU (1)          ',T41,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS     ',T41,'TN'/)
      READ(5,2000,ERR=1061) K5Q
      IF(K5Q.EQ.K5(1)) GO TC 510
      IF(K5Q.EQ.K5(2)) GC TC 520
      IF(K5C.EQ.K5(3)) GC TO 530
      IF(K5Q.EQ.KK(1)) GO TO 9975
      IF(K5Q.EQ.KK(2)) GO TO 998
C- #3 -------------------------------------------------------------------
      IF(K5C.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 5
C***********************************************************************
C MENU 6  SURVIVABILITY ASSESSMENT
C***********************************************************************
150       CALL FRTCMS('CLRSCRN ')
6           CONTINUE
      WRITE(4,1150)
1150  FORMAT(' ','MENU (6)  SURVIVABILITY ASSESSMENT'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T41,'HP'/
     +T6,'P(S) 1:1 A/A (GUNS)             ',T41,'AG'/
     +T6,'P(S) 1:1 A/A (IR MISSILE)       ',T41,'AM'/
     +T6,'P(S) 1:1 LOW ALT SAM            ',T41,'LS'/
     +T6,'SINGLE SORTIE                   ',T41,'SS'/
     +T6,'CAMPAIGN EVALUATION             ',T41,'CE'/
     +T6,'TO RETURN TO MENU (1)           ',T41,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS      ',T41,'TN'/)
      READ(5,2000,ERR=1061) K6Q
      IF(K6C.EQ.K6(1)) GO TC 610
      IF(K6C.EQ.K6(2)) GO TO 620
```

```
      IF(K6Q.EQ.K6(3)) GO TO 630
      IF(K6Q.EQ.K6(4)) GO TO 640
      IF(K6C.EQ.K6(5)) GO TO 650
      IF(K6Q.EQ.KK(1)) GO TO 9978
      IF(K6Q.EQ.KK(2)) GO TO 998
C- #3 ----------------------------------------------------------------
      IF(K6C.EQ.KK(4)) GO TC 7
      WRITE(4,120C)
      GO TO 6
C
C- #3 ----------------------------------------------------------------
C********************************************************************
C**   MENU 7   REASSESSMENT                                         **
C********************************************************************
  7   CONTINUE
      CALL ESRPDS(JAM,IRCS,PDSM)
      CALL ESRPHG(TW,WS,PHG)
      CALL ESRPHM(TW,WS,IRJAM,IRFLAR,IRSUP,PHM)
      CALL ESRPHS(IWARN,ICHAFF,XMDM,WS,PHSM)
      CALL ESRAVG(IFS,IFV,IFE,IEA,IEP,ICS,ICA,TW,WS,XMDA,XMDM,XMDD,WT,
     *              AVAAG,APAAG,PKHAAG)
      CALL ESRAVM(IFS,IFV,APAAG,AVAAM,PKHAAM)
      CALL ESRAVS(IFS,IFV,APAAG,VASM,PKHSM)
C
C
      PSAG = 1. - PDAAG * PHG * PKHAAG
      PSAM = 1. - PDAAM * PHM * PKHAAM
      PSSM = 1. - PDSM * PHSM * PKHSM
C
      CALL CAMP(AAL,AAH,AAD,PKHAAG,PSAG,AAL,AAH,AAD,PKHAAM,PSAM,
     *          SAML,SAMH,SAMD,PKHSM,PSSM,ACR1,NSRT,XNPASS,NS,
     *          ACR2,TCTSR,TCTACK,TOTACL,TCTACR)
C
      GO TO 1
C
C
C- #5 ----------------------------------------------------------------
C********************************************************************
C**   MENU (8)     ROUTINE TO GENERATE P(K) VALUES FOR PLOTTING     **
C********************************************************************
    8 CONTINUE
      IF(N.GE.3) GC TC 999
      CALL FRTCMS('CLRSCRN ')
      WRITE(4,801)N
  801 FORMAT('1',' MENU(8) GRAPH CHOICES'//
     *       T6,'DC YOU WISH TO SAVE P(K) FOR THIS DESIGN?'/
     *       T6,'NCTE:  YOU HAVE ALREADY CHOSEN ',I1,' OF THE',
     *          ' 3 POSSIBLE DESIGNS'/T6,'FOR THIS PLOT.'//
```

```
     *        T6,'ENTER A CODE AS FOLLOWS:'/
     *        T6,'    TO SAVE P(K)',T51,'Y'/
     *        T6,'    DO NOT SAVE',T51,'N'/
     *        T6,'    FOR FURTHER EXPLANATION',T51,'HP')
C
      READ(4,2000)K8Q
         IF(K8Q.EQ.JJ(1)) GO TO 81
         IF(K8Q.EQ.JJ(2)) GO TO 999
         IF(K8Q.EQ.KK(1)) GO TO 8888
C
      WRITE(4,1200)
      GO TO 8
   81 CONTINUE
         N = N + 1
         PKAG(N) = 1. - PSAG
         PKAM(N) = 1. - PSAM
         PKSM(N) = 1. - PSSM
C
      IF(N.NE.3) GO TO 999
C
      WRITE(7,802)(PKAG(I),PKAM(I),PKSM(I),I=1,3)
  802 FORMAT(F4.2)
      GO TO 999
C*************************************************************************
C MENU 21   A/C PERFORMANCE INPUTS
C*************************************************************************
210      CALL FRTCMS('CLRSCRN ')
21        CONTINUE
      WRITE(4,1210)TW,WS,WT,B,XL,W,EC,ED,EL,DL
1210  FORMAT(' ',' MENU (21) ENTER  A CODE AS FOLLOWS:'//
     +T16,'   A/C PERFORMANCE INDICATORS  '/
     +T6,'1   THRUST TO WEIGHT            ',T41,F6.4/
     +T6,'2   WING LOADING                ',T41,F6.2,' PSF'/
     +T6,'3   ORDNANCE WEIGHT             ',T41,F6.0,' LBS'/
     +T6,'    WING SPAN                   ',T41,F6.2,' FT'/
     +T6,'    FUSELAGE LENGTH             ',T41,F6.2,' FT'/
     +T6,'    FUSELAGE WIDTH              ',T41,F6.2,' FT'/
     +T6,'    ENGINE FACE TO QUARTER CORD',T41,F6.2,' FT'/
     +T6,'    ENGINE DIAMETER             ',T41,F6.2,' FT'/
     +T6,'    ENGINE LENGTH               ',T41,F6.2,' FT'/
     +T6,'    DUCT LENGTH                 ',T41,F6.2,' FT'//
     +T6,'VALUES 1,2, &3 ARE VARIABLE; TO CHANGE THEM ENTER ITS NUMBER I
     +N'/T6,'I1 FORMAT. ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
1211  FORMAT(I1)
      IF(I1.EQ.0) GO TO 110
      GO TO (211,212,213),I1
1212  WRITE(4,1200)
```

```
      GO TO 210
211       CCNTINUE
          WRITE(4,1201)
1201      FCRMAT(' ','         TW RANGE ALLCWED IS .80 TO 1.2'/
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
1202      FORMAT(F8.4)
          TW=V1
          GC TO 210
212       CCNTINUE
          WRITE(4,1203)
1203      FCRMAT(' ','         WS RANGE ALLCWED IS 60. TO 80.'/
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          WS=V1
          GC TO 210
213       CCNTINUE
          WRITE(4,1204)
1204      FORMAT(' ','         WT RANGE ALLCWED IS 5000. TO 10000.'/
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          WT=V1
          GC TO 210
C*********************************************************************
C MENU 22  SUSCEPTIBILITY FEATURES
C*********************************************************************
220      CALL FRTCMS('CLRSCRN ')
22        CCNTINUE
      WRITE (4,1220)JAM,IRCS,IWARN,ICHAFF,IRJAM,IRFLAR,IRSUP
1220  FORMAT(' ','      MENU (22) ENTER  A CODE AS FOLLOWS:'//
     +T16,'     SUSCEPTIBILITY REDUCTION FEATURES      '//
     +T6,'1   JAMMER NUMBER              ',T41,I1/
     +T6,'2   RCS REDUCTION LEVEL        ',T41,I1/
     +T6,'3   RADAR WARNING RECEIVER     ',T41,I1/
     +T6,'4   CHAFF DISPENSER            ',T41,I1/
     +T6,'5   IR JAMMER                  ',T41,I1/
     +T6,'6   IR FLARE DISPENSER         ',T41,I1/
     +T6,'7   IR SUPPRESSICN TECHNIQUE',T41,I1//
     +T6,'"0" INDICATES NOT INSTALLEC "1" INDICATES INSTALLED'//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT'/
     +T6,'ENTER 0 FCR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TC 110
      GO TO (221,222,223,224,225,226,227),I1
1229  WRITE(4,1200)
      GO TO 220
221       CCNTINUE
         CALL FRTCMS('CLRSCRN ')
```

```
      WRITE(4,1221)
1221  FORMAT(' ','          JAMMERS AVAILABLE          '//
     +T6,'0                        00    ',/
     +T6,'1                        50 WATTS',/
     +T6,'2                       100 WATTS',/
     +T6,'3                       200 WATTS',/
     +T6,'4                       500 WATTS',/
     +T6,'5                      1000 WATTS',//
     +T6,'ENTER THE JAMMER NUMBER IN I1 FORMAT')
      READ(5,1211)I1
      JAM=I1
      GO TO 220
222   CONTINUE
     CALL FRTCMS('CLRSCRN ')
      WRITE(4,1222)
1222  FORMAT(' ','          RCS REDUCTION LEVELS          '//
     +T6,'0                  NO REDUCTION   ',/
     +T6,'1                  PROCEDURE 1',/
     +T6,'2                  PROCEDURE 1 & 2',/
     +T6,'3                  PROCEDURE 1 & 3',/
     +T6,'4                  PROCEDURE 1,3, & 5',/
     +T6,'5                  PROCEDURE 1,3,5, & 6',/
     +T6,'6                  PROCEDURE 1,4,5,6,7, & 8',//
     +T6,'ENTER THE DESIRED RCS LEVEL IN I1 FORMAT')
      READ(5,1211)I1
      IRCS=I1
      GO TO 220
223   CONTINUE
      WRITE(4,1223)
1223  FORMAT(' ','          RADAR WARNING RECEIVER          '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      IWARN=I1
      GO TO 220
224   CONTINUE
      WRITE(4,1224)
1224  FORMAT(' ','          CHAFF DISPENSER          '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      ICHAFF=I1
      GO TO 220
225   CONTINUE
      WRITE(4,1225)
1225  FORMAT(' ','          IR JAMMER          '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
```

```
      READ(5,1211)I1
      IRJAM=I1
      GC TO 220
226   CCNTINUE
      WRITE(4,1226)
1226  FORMAT(' ','         IR FLARE DISPENSER               '//
     +T6,'"C" INDICATES NOT INSTALLEC, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      IRFLAR=I1
      GC TO 220
227   CCNTINUE
     CALL FRTCMS('CLRSCRN ')
      WRITE(4,1227)
1227 FORMAT(' ','     SUPPRESSION TECHNIGUES AVAILABLE'//
     +T6,'0            NONE    ',/
     +T6,'1            AEROSCL DISPENSER',/
     +T6,'2            COLD PLUG',//
     +T6,'ENTER THE TECHNIQUE NUMBER IN I1 FORMAT')
      READ(5,1211)I1
      IRSUP=I1
      GC TO 220
C*******************************************************************
C MENU 23  VULNERABILITY FEATURES
C*******************************************************************
230     CALL FRTCMS('CLRSCRN ')
23        CCNTINUE
     WRITE(4,1230)IFS,IFV,IFE,IEA,IEP,ICS,ICA
1230 FORMAT(' ','      MENU (23) ENTER  A CODE AS FOLLOWS:'//
     +T16,'     VULNERABILITY  REDUCTION FEATURES   '//
     +T6,'1   FUEL SYSTEM GENERAL        ',T41,I1/
     +T6,'2   FUEL/VCID INTERFACE        ',T41,I1/
     +T6,'3   FUEL/ENGINE INTERFACE      ',T41,I1/
     +T6,'4   ENGINE ARRANGEMENT         ',T41,I1/
     +T6,'5   ENGINE PROTECTION          ',T41,I1/
     +T6,'6   CCNTROL SYSTEM             ',T41,I1/
     +T6,'7   CREW ARRANGMENT            ',T41,I1//
     +T6,'"1" MINIMUM PROTECTION '/
     +T6,'TC CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT'//
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
     READ(5,1211)I1
     IF(I1.EQ.0) GO TC 110
     GO TO (231,232,233,234,235,236,237),I1
1239 WRITE(4,1200)
     GO TO 230
231       CCNTINUE
     CALL FRTCMS('CLRSCRN ')
      WRITE(4,1231)
```

```
1231  FORMAT(' ','          FUEL SYSTEM, GENERAL        '//
     +T6,'1    SINGLE SUMP TANK, NO SELF-SEALING  ',/
     +T6,'2    SINGLE SUMP TANK, WITH SELF-SEALING',/
     +T6,'3    DUAL SUMP TANKS , NO SELF-SEALING    ,   NO SEPARATION',/
     +T6,'4    DUAL SUMP TANKS , WITH SELF-SEALING ,   NO SEPARATION',/
     +T6,'5    DUAL SUMP TANKS , EXTRA SELF-SEALING,   NO SEPARATION',/
     +T6,'6    DUAL SUMP TANKS , NO SELF-SEALING    , WITH SEPARATION',/
     +T6,'7    DUAL SUMP TANKS , WITH SELF-SEALING , WITH SEPARATION',/
     +T6,'8    DUAL SUMP TANKS , EXTRA SELF-SEALING, WITH SEPARATION',//
     +T6,'ENTER THE PROTECTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          IFS=I1
          GO TO 230
232       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1232)
1232  FORMAT(' ','          FUEL/VOID INTERFACE        '//
     +T6,'1    TANKS ADJACENT TO DRY BAYS, HIGH SURFACE TEMP',/
     +T6,'2    TANKS ADJACENT TO DRY BAYS WITH ELECTRICAL EQUIPMENT',/
     +T6,'3    TANKS ADJACENT TO DRY BAYS WITH INERTING EQUIPMENT   ',/
     +T6,'4    INTERNAL FOAM OR INERTING FOR TANK ULLAGES           ',/
     +T6,'5    EXTERNAL FOAM OR FIRE EXTINGUISHING FOR VOIDS        ',/
     +T6,'6    BOTH INTERNAL AND EXTERNAL PROTECTION 2 OR 4 & 3 OR 5',//
     +T6,'ENTER THE DESIRED PROTECTION LEVEL IN I1 FORMAT')
          READ(5,1211)I1
          IFV=I1
          GO TO 230
233       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1233)
1233  FORMAT(' ','          FUEL/ENGINE INTERFACE      '//
     +T6,'1    FUEL AROUND ENGINE                  ',/
     +T6,'2    FUEL AROUND ENGINE WITH PROTECTION  ',/
     +T6,'3    FUEL AROUND DUCTS                   ',/
     +T6,'4    FUEL AROUND DUCTS WITH PROTECTION   ',/
     +T6,'5    DUCTS AROUND FUEL                   ',/
     +T6,'6    DUCTS AROUND FUEL WITH PROTECTION   ',/
     +T6,'7    FUEL FORWARD OF ENGINE              ',/
     +T6,'8    POSITIVE FUEL/ENGINE SEPARATION     ',//
     +T6,'ENTER THE PROTECTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          IFE=I1
          GO TO 230
234       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1234)
1234  FORMAT(' ','          ENGINE ARRANGEMENT         '//
     +T6,'1   ONE ENGINE, OR TWO ENGINES SEPARATED BY LESS THAN 2 FT',/
```

```
     +T6,'2   TWO ENGINES SEPARATED OVER 2 FT              ',//
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          IEA=I1
          GO TO 230
235       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1235)
1235  FORMAT(' ','           ENGINE PROTECTION          '//
     +T6,'1   NONE                                      ',/
     +T6,'2   WITH PROTECTION AND/OR OVER 6 FT OF SEPARATION',//
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          IEP=I1
          GO TO 230
236       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1236)
1236  FORMAT(' ','           CONTROL SYSTEM             '//
     +T6,'1    NO BACKUP - OVER 5 SINGLE POINT FAILURE (SPF) SITES',/
     +T6,'2    NO BACKUP - UNDER 5 SPF SITES',/
     +T6,'3    WITH BACKUP - OVER 5 SPF SITES    ',/
     +T6,'4    WITH BACKUP - UNDER 5 SPF SITES    ',/
     +T6,'5    NO SINGLE POINT FAILURE SITES ',/
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          ICS=I1
          GO TO 230
237       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1237)
1237  FORMAT(' ','           CREW ARRANGEMENT           '//
     +T6,'1    NO BOTTOM SHIELD FOR PILOT BY ARMOR OR EQUIPMENT',/
     +T6,'2    NO SIDE SHIELD FOR PILOT BY ARMOR OR EQUIPMENT',/
     +T6,'3    PARTIAL ARMOR PROTECTION WITH STANDOFF(FRONT AND/OR BOTTO
     &M)',/
     +T6,'4    PARTIAL ARMOR PROTECTION WITH NO STANDOFF(FRONT AND/OR BO
     &TTOM)',/
     +T6,'5    FULL ARMOR PROTECTION WITH STANDOFF (FRONT,BOTTOM, AND SI
     &DES)',/
     +T6,'6    FULL ARMOR PROTECTION WITH NO STANDOFF (FRONT,BOTTOM AND
     &SIDES)',//
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          ICA=I1
          GO TO 230
C**********************************************************************
C MENU 31  MISSION DESCRIPTION
```

```
C*****************************************************************
310       CALL FRTCMS('CLRSCRN ')
31         CCNTINUE
     WRITE(4,1310)XMDA,XMDM,XMDD
1310 FORMAT(' ','        MENU (31)                           '//
    +T6,'      MISSION DESCRIPTION           '//
    +T6,'1   MISSION CASH ALTITUDE     ',T41,F6.0,' FT.'/
    +T6,'2   MISSION DASH MACH         ',T41,F6.4,' MACH'/
    +T6,'3   MISSION CASH CISTANCE     ',T41,F6.0,' MILES'//
    +T6,'TO CHANGE THEM ENTER ITS NUMBER IN I1 FORMAT.'//
    +T6,' ENTER C FCR NO CHANGE REQUIRED')
     READ(5,1211)I1
     IF(I1.EQ.0) GO TC 120
     GO TO (311,312,313),I1
1319 WRITE(4,120C)
     GO TO 310
311        CCNTINUE
           WRITE(4,1311)
1311       FCRMAT(' ','        MISSION CASH ALT RANGE              FT'//
    +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XMCA=V1
           GC TC 310
312        CCNTINUE
           WRITE(4,1312)
1312       FORMAT(' ','        MISSION CASH MACH RANGE 0.8 TO 1.2 MACH'//
    +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XMDM=V1
           GC TO 310
313        CCNTINUE
           WRITE(4,1313)
1313       FORMAT(' ','        MISSION DASH CISTANCE               NM'//
    +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XMDD=V1
           GC TC 310
C*****************************************************************
C MENU 32  THREAT DEFINITICN
C*****************************************************************
320       CALL FRTCMS('CLRSCRN ')
32         CCNTINUE
     WRITE (4,1320)AAH,AAC,AAL,SAMH,SAMC,SAML
1320 FORMAT(' ','        MENU (32)                           '//
    +T6,'      THREAT CEFINITION           '//
    +T6,'1   A/A THREAT DENSITY        ',T41,F6.4,' WP/SQ.MI.'/
    +T6,'2   A/A THREAT DIAMETER       ',T41,F6.2,' MI.'/
    +T6,'3   A/A PENETRATICN DIST      ',T41,F6.2,' MI'/
```

```
     +T6,'4    SAM THREAT DENSITY         ',T41,F6.4, ' WP/SQ.MI.'/
     +T6,'5    SAM THREAT DIAMETER        ',T41,F6.2,' MI'/
     +T6,'6    SAM PENETRATION DIST       ',T41,F6.2,' MI'//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'//
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 120
      GO TO (321,322,323,324,325,326),I1
1329  WRITE(4,1200)
      GO TO 320
321          CONTINUE
             WRITE(4,1321)
1321         FORMAT(' ','          A/A THREAT DENSITY RANGE 0.0 TO .02     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
             READ(5,1202)V1
             AAH=V1
             GO TO 320
322          CONTINUE
             WRITE(4,1322)
1322         FORMAT(' ','          A/A THREAT DIAMETER RANGE 0.0 TO 5.   '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
             READ(5,1202)V1
             AAD=V1
             GO TO 320
323          CONTINUE
             WRITE(4,1323)XMDD
1323         FORMAT(' ','          A/A PENETRATION DIST RANGE 0.0 TO ',F6.0,
     +' MILES'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
             READ(5,1202)V1
             AAL=V1
             GO TO 320
324          CONTINUE
             WRITE(4,1324)
1324         FORMAT(' ','          SAM THREAT DENSITY RANGE 0.0 TO .002  '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
             READ(5,1202)V1
             SAMH=V1
             GO TO 320
325          CONTINUE
             WRITE(4,1325)
1325         FORMAT(' ','          SAM THREAT DIAMETER RANGE 0.0 TO 25.  '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
             READ(5,1202)V1
             SAMD=V1
             GO TO 320
326          CONTINUE
             WRITE(4,1326)XMDD
```

```
1326      FCRMAT(' ','       SAM PENETRATION DIST. RANGE 0.0 TO ',F6.0,
     +' MILES'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          SAML=V1
          GC TO 32C
C*******************************************************************
C MENU 41  PROB OF DETECTION
C*******************************************************************
410      CALL FRTCMS('CLRSCRN ')
41        CCNTINUE
      WRITE(4,1410)
1410  FORMAT(' ','MENU (41) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T41,'HP'/
     +T6,'P(D) VS A/A (GUNS)              ',T41,'AG'/
     +T6,'P(C) VS A/A (IR MISSILE)        ',T41,'AM'/
     +T6,'P(D) VS LOW ALTITUCE SAM        ',T41,'LS'/
     +T6,'TC RETURN TO MENU (4)           ',T41,'RT'/
     +T6,'TC TRANSFER TO OTHER MENUS      ',T41,'TN'/)
      READ(5,2000) K7Q
      IF(K7Q.EQ.K6(1)) GO TC 411
      IF(K7Q.EQ.K6(2)) GO TO 412
      IF(K7C.EQ.K6(3)) GO TC 413
      IF(K7Q.EQ.KK(1)) GC TC 9976
      IF(K7Q.EQ.KK(2)) GC TC 998
      IF(K7C.EQ.KK(4)) GC TO 130
      WRITE(4,1200)
      GO TC 41
C*******************************************************************
C     PD A/A GUNS
C*******************************************************************
411      CALL FRTCMS('CLRSCRN ')
      WRITE(4,1411)PDAAG
1411  FORMAT(' ',T6,'THE PRCBABILITY OF DETECTION BY A/A (GUNS) IS '
     +,F6.4//T6,'TC CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FCR NO CHANGE REQUIREC')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TC 410
      IF(I1.EQ.1) GO TO 1413
1419  WRITE(4,1200)
      GO TO 411
1413      CONTINUE
          WRITE(4,1417)
1417      FORMAT(' ','       PD  RANGE   0.0 TO 1.0    '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          PDAAG=V1
          GC TO 411
```

```
C**********************************************************************
C      PD A/A IR MISSILE
C**********************************************************************
412        CALL FRTCMS('CLRSCRN ')
      WRITE(4,1415)PDAAM
1415  FORMAT(' ',T6,'THE PROBABILITY OF DETECTION BY A/A (MISSILE) IS '
     +,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 410
      IF(I1.EQ.1) GO TO 1416
1418  WRITE(4,1200)
      GO TO 412
1416        CONTINUE
            WRITE(4,1417)
            READ(5,1202)V1
            PDAAM=V1
            GO TO 412
C**********************************************************************
C      PD VS SAM
C**********************************************************************
413         CONTINUE
           CALL ESRPDS (JAM,IRCS,PDSM)
           CALL FRTCMS('CLRSCRN ')
1490  WRITE(4,1491)PDSM
1491  FORMAT(' ',T6,'THE COMPUTED PROBABILITY OF DETECTION BY LOW ALT SA
     +M (RADAR) IS ',F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 410
      IF(I1.EQ.1) GO TO 1492
1493  WRITE(4,1200)
      GO TO 1490
1492        CONTINUE
            WRITE(4,1417)
            READ(5,1202)V1
            PDSM=V1
            GO TO 1490
C**********************************************************************
C MENU 42   PROB OF HIT
C**********************************************************************
420        CALL FRTCMS('CLRSCRN ')
42          CONTINUE
      WRITE(4,1420)
1420  FORMAT(' ','MENU (42) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION               ',T41,'HP'/
     +T6,'P(H) VS A/A (GUNS)               ',T41,'AG'/
     +T6,'P(H) VS A/A (IR MISSILE)         ',T41,'AM'/
```

```
     +T6,'P(H) VS LOW ALTITUDE SAM       ',T41,'LS'/
     +T6,'TO RETURN TO MENU (4)          ',T41,'RT'/
     +T6,'TC TRANSFER TO OTHER MENUS     ',T41,'TN'/)
      READ(5,2000) K8Q
      IF(K8Q.EQ.K6(1)) GC TC 421
      IF(K8Q.EQ.K6(2)) GC TC 422
      IF(K8Q.EQ.K6(3)) GO TC 423
      IF(K8C.EC.KK(1)) GO TO 9977
      IF(K8Q.EQ.KK(2)) GC TC 998
      IF(K8Q.EQ.KK(4)) GC TC 130
      WRITE(4,120C)
      GO TO 42
C*****************************************************************
C     PROB CF HIT A/A GUNS
C*****************************************************************
421     CONTINUE
          CALL ESRPHG(TW,WS,PHG)
1421      CALL FRTCMS('CLRSCRN ')
          WRITE (4,14911)PHG
14911   FORMAT(' ',T6,'THE CCMPUTED PROBABILITY OF HIT BY A/A(GUNS) IS '
     +,F6.4//T6,'TC CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FCR NC CHANGE REQUIREC')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 420
        IF(I1.EQ.1) GO TO 14212
14913   WRITE(4,12C0)
        GO TC 1421
14212      CCNTINUE
           WRITE(4,1497)
1497       FCRMAT(' ','        PH  RANGE   0.0 TO 1.0      '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           PHG=V1
           GC TO 1421
C*****************************************************************
C     PROB CF HIT A/A MISSILE
C*****************************************************************
422     CONTINUE
          CALL ESRPHM(TW,WS,IRJAM,IRFLAR,IRSUP,PHM)
1422      CALL FRTCMS('CLRSCRN ')
          WRITE(4,14921)PHM
14921   FORMAT(' ',T6,'THE COMPUTED PROBABILITY OF HIT BY A/A (IR MISSILE
     +) IS ',F6.4//T6,'TC CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FCR NO CHANGE REQUIRED')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 420
        IF(I1.EQ.1) GO TO 14222
14929   WRITE(4,12C0)
```

```
      GO TO 1422
14222     CONTINUE
          WRITE(4,1497)
          READ(5,1202)V1
          PHM=V1
          GO TO 1422
C***********************************************************************
C      PROB OF HIT LOW ALT SAM
C***********************************************************************
423   CONTINUE
        CALL ESRFHS(IWARN,ICHAFF,XMCM,WS,PHSM)
1423    CALL FRTCMS('CLRSCRN ')
        WRITE (4,14923)PHSM
14923 FORMAT(' ',T6,'THE COMPUTED PROBABILITY OF HIT BY LOW ALTITUDE SA
     +M IS ',F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 420
      IF(I1.EQ.1) GO TO 14232
14933 WRITE(4,1200)
      GO TO 1423
14232     CONTINUE
          WRITE(4,1497)
          READ(5,1202)V1
          PHSM=V1
          GO TO 1423
C***********************************************************************
C MENU 51  VULN. AREA / P(K/H) VS A/A GUNS
C***********************************************************************
510   CONTINUE
       CALL ESRAVG(IFS,IFV,IFE,IEA,IEP,ICS,ICA,TW,WS,XMDA,XMCM,XMDD,WT,
     &AVAAG,APAAG,PKHAAG)
1511    CALL FRTCMS('CLRSCRN ')
        WRITE (4,1512)AVAAG,PKHAAG
1512  FORMAT(' ',T6,'VERSUS THE AIA-TO-AIR GUNS'/
     +T6,'THE COMPUTED VULNERABLE AREA VS IS ',T51,F6.0,' SQ.FT.'/
     +T6,'THE P(K/H) IS ',T51,F6.4,//
     +T6,'TO CHANGE THESE VALUES ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 140
      IF(I1.EQ.1) GO TO 1513
1514  WRITE(4,1200)
      GO TO 1511
1513      CONTINUE
          WRITE(4,1515)
1515      FORMAT(' ','        VULNERABLE AREA RANGE   "0.0 TO 600."  '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
```

```
      READ(5,1202)V1
      AVAAG=V1
      PKHAAG = AVAAG/APAAG
      GC TO 1511
C*********************************************************************
C     VULN. AREA / P(K/H) VS A/A MISSILE IR
C*********************************************************************
520   CONTINUE
    CALL ESRAVM(IFS,IFV,APAAG,AVAAM,PKHAAM)
1521   CALL FRTCMS('CLRSCRN ')
       WRITE (4,1522)AVAAM,PKHAAM
1522  FORMAT(' ',T6,'VERSUS THE AIA-TO-AIR IR MISSILE'/
     +T6,'THE COMPUTED VULNERABLE AREA VS IS ',T51,F6.0,' SQ.FT.'/
     +T6,'THE P(K/H) IS ',T51,F6.4,//
     +T6,'TC CHANGE THESE VALUES ENTER 1
     +'/T6,' ENTER 0 FCR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 140
      IF(I1.EQ.1) GC TO 1523
1524  WRITE(4,12CC)
      GO TO 1521
1523  CCNTINUE
      WRITE(4,1525)
1525  FCRMAT(' ',' VULN. AREA RANGE 0 TO 600 '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
      READ(5,1202)V1
      AVAAM=V1
      PKHAAM = AVAAM/APAAG
      GC TO 1521
C*********************************************************************
C     VULN. AREA / P(K/H) VS LOW ALT SAM
C*********************************************************************
530   CCNTINUE
    CALL ESRAVS(IFS,IFV,APAAG,VASM,PKHSM)
1531   CALL FRTCMS('CLRSCRN ')
       WRITE (4,1532)VASM,PKHSM
1532  FORMAT(' ',T6,'VERSUS THE LOW ALTITUDE SAM'/
     +T6,'THE CCMPUTED VULNERABLE AREA VS IS ',T51,F6.0,' SQ.FT.'/
     +T6,'THE P(K/H) IS ',T51,F6.4,//
     +T6,' TO CHANGE THESE VALUES ENTER 1'/
     +T6,' ENTER 0 FCR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EC.0) GO TO 140
      IF(I1.EQ.1) GO TO 1533
1534  WRITE(4,12CC)
      GO TC 1531
1533  CCNTINUE
      WRITE(4,1535)
```

```
1535      FORMAT(' ',"      VULNERABLE AREA RANGE   0.0 TO 600.0  '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          VASM=V1
          PKHSM =  VASM/APAAG
          GO TO 1531
C*****************************************************************
C MENU 61   P(S) A/A GUN
C*****************************************************************
610      PSAG = 1.- PDAAG * PHG * PKHAAG
618      CALL FRTCMS('CLRSCRN ')
      WRITE (4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IRJAM,IEP,
     +IRFLAR,ICS,IRSUP,ICA
2220  FORMAT('0','* SUSCEPTIBILITY REDUCTION FEATURES ',
     +T40,' * VULNERABILITY  REDUCTION FEATURES   '//
     +,'     JAMMER NUMBER              ',T35,I1,
     +T42,'    FUEL SYSTEM GENERAL       ',T69,I1/
     +,'     RCS REDUCTION LEVEL        ',T35,I1,
     +T42,'    FUEL/VOID INTERFACE       ',T69,I1/
     +,'     RADAR WARNING RECEIVER     ',T35,I1,
     +T42,'    FUEL/ENGINE INTERFACE     ',T69,I1/
     +,'     CHAFF DISPENSER            ',T35,I1,
     +T42,'    ENGINE ARRANGEMENT        ',T69,I1/
     +,'     IR JAMMER                  ',T35,I1,
     +T42,'    ENGINE PROTECTION         ',T69,I1/
     +,'     IR FLARE DISPENSER         ',T35,I1,
     +T42,'    CONTROL SYSTEM            ',T69,I1/
     +,'     IR SUPPRESSION TECHNIQUE',T35,I1,
     +T42,'    CREW ARRANGMENT           ',T69,I1//)
         WRITE(4,1610)PSAG,PDAAG,PHG,PKHAAG
1610     FORMAT(' ',T6,' THE PROB OF SURVIVAL VS A/A(GUNS)'//
     +T6,'    PS   =  1  -   PD   *   PH   *   PK/H '/
     +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
     +T6,'TO CHANGE THIS VALUE ENTER 1 IN I1 FORMAT'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
      IF(I1.EQ.0) GO TO 150
      GO TO (611,1619),I1
1619  WRITE(4,1200)
          GO TO 618
611       CONTINUE
          WRITE(4,1611)
1611  FORMAT(' ',T6,'ENTER PROBABILITY OF P(D), P(H), AND P(K/H) IN REAL
     +NUMBER FORMAT'/
     +T6,'                   (RANGE 0.001 TO 1.00)')
          READ(5,1657)PDAAG,PHG,PKHAAG
          PSAG=1.- PDAAG * PHG * PKHAAG
          GO TO 618
```

```
C*********************************************************************
C       P(S) A/A IR MISSILE
C*********************************************************************
620         PSAM = 1.- PDAAM * PHM * PKHAAM
628         CALL FRTCMS('CLRSCRN ')
       WRITE (4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IRJAM,IEP,
      +IRFLAR,ICS,IRSUP,ICA
            WRITE(4,1620)PSAM,PDAAM,PHM,PKHAAM
1620        FORMAT(' ',T6,' THE PROB OF SURVIVAL VS A/A (IR MISSILE)'//
      +T6,'    PS    =  1  -    PD    *    PH    *    PK/H '/
      +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
      +T6,'TC CHANGE THIS VALUE ENTER 1 IN I1 FORMAT.'/
      +T6,'ENTER 0 FCR NO CHANGE REQUIRED')
       READ(5,1659)I1
       IF(I1.EQ.0) GO TO 150
       GO TO (621,1629),I1
1629   WRITE(4,1200)
             GC TO 628
621          CCNTINUE
             WRITE(4,1611)
             READ(5,1657)PDAAM,PHM,PKHAAM
             PSAM=1.- PDAAM * PHM * PKHAAM
             GC TO 628
C*********************************************************************
C       P(S) LOW ALT SAM
C*********************************************************************
630         PSSM = 1.- PDSM * PHSM * PKHSM
638         CALL FRTCMS('CLRSCRN ')
       WRITE (4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IRJAM,IEP,
      +IRFLAR,ICS,IRSUP,ICA
            WRITE(4,1630)PSSM,PDSM,PHSM,PKHSM
1630        FORMAT(' ',T6,' THE PROB OF SURVIVAL VS SAM  '//
      +T6,'    PS    =  1  -    PD    *    PH    *    PK/H '/
      +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
      +T6,'TC CHANGE THIS VALUE ENTER 1 IN I1 FORMAT.'/
      +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
       READ(5,1659)I1
       IF(I1.EQ.0) GO TC 150
       GO TO (631,1639),I1
1639   WRITE(4,1200)
             GC TO 638
631          CONTINUE
             WRITE(4,1611)
             READ(5,1657)PDSM,PHSM,PKHSM
             PSSM=1.- PDSM * PHSM * PKHSM
             GO TO 638
C**********************************************************************
C MENU 62       SORTIE ANALYSIS
```

```
C*****************************************************************************
640       CONTINUE
649       CALL FRTCMS('CLRSCRN ')
      WRITE (4,1640)ACR,XNPASS,PSAG,PSAM,PSSM
1640  FORMAT(' ',' MENU (62)  SORTIE ANALYSIS '//
     +T6,'1    AIRCRAFT IN SCRTIE               ',T46,F6.0/
     +T6,'2    NUMBER CF PASSES PER SCRTIE      ',T44,F6.0/
     +T6,'3    P(S) VS A/A(GUNS)                ',T48,F6.4/
     +T6,'4    P(S) VS A/A(IR MISSILE)          ',T48,F6.4/
     +T6,'5    P(S) VS LOW ALT SAM              ',T48,F6.4//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
      IF(I1.EQ.0) GO TC 689
      GO TO (641,642,618,628,638),I1
1648  WRITE(4,1200)
          GC TO 640
641       CCNTINUE
          WRITE(4,1651)
          READ(5,1657)V1
          ACR=V1
          GO TO 649
642       CCNTINUE
          WRITE(4,1653)
          READ(5,1202)V1
          XNPASS=V1
          GO TO 649
689   CALL SCRT( AAL,AAH,AAD,PKHAAG,PSAG,
     &           AAL,AAH,AAD,PKHAAM,PSAM,  SAML,SAMH,SAMD,PKHSM,PSSM,
     & ACR,NSRT,XNPASS,NS,          ACR2,TCTSR,TOTACK,TOTACL,TOTACR)
        CALL FRTCMS('CLRSCRN ')
      WRITE (4,1689)ACR2,TOTSR,TOTACK,TOTACL,TOTACR
1689  FORMAT(' ','      RESULTS FROM SINGLE SORTIE AGAINST THE THREATS'//
     +T6,'    UNDAMAGEC AIRCRAFT          ',T41,F6.2/
     +T6,'    SCRTIES FLOWN              ',T41,F6.2/
     +T6,'    TARGETS ATTACKED           ',T41,F6.2/
     +T6,'    AIRCRAFT LOST              ',T41,F6.2/
     +T6,'    AIRCRAFT DAMAGED           ',T41,F6.2//
     +T6,'TC RERUN A SORTIE ANALYSIS ENTER 1 '/
     +T6,'TC RETURN TC MENU (6) ENTER 0')
      READ(5,1211)I1
       IF(I1.EQ.1) GO TO 640
       GO TO 150
C*****************************************************************************
C MENU 63  CAMPAIGN ANALYSIS
C*****************************************************************************
650       CONTINUE
659         CCNTINUE
```

```
      CALL FRTCMS('CLRSCRN ')
     WRITE (4,1650)ACR1,NSRT,XNPASS,NS,PSAG,PSAM,PSSM
1650 FORMAT(' ',' MENU (63)  CAMPAIGN ANALYSIS '//
    +T6,'1    AIRCRAFT IN CAMPAIGN            ',T46,F6.0/
    +T6,'2    NUMBER OF RAIDS IN CAMPAIGN   ',T43,I6/
    +T6,'3    NUMBER OF PASSES PER SORTIE   ',T44,F6.0/
    +T6,'4    NUMBER OF SORTIES FOR REPAIR ',T43,I6//
    +T6,'5    P(S) VS A/A(GUNS)             ',T48,F6.4/
    +T6,'6    P(S) VS A/A(IR MISSILE)       ',T48,F6.4/
    +T6,'7    P(S) VS LOW ALT SAM           ',T48,F6.4//
    +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'/
    +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
     READ(5,1659)I1
1659 FORMAT(I1)
     IF(I1.EQ.0) GO TO 699
     GO TO (651,652,653,654,618,628,638),I1
1658 WRITE(4,1200)
        GO TO 650
651     CONTINUE
        WRITE(4,1651)
1651    FORMAT(' ',T6,'ENTER NUMBER OF A/C IN REAL NUMBER FORMAT.')
        READ(5,1657)V1
1657    FORMAT(F8.4)
        ACR1=V1
        GO TO 659
652     CONTINUE
        WRITE(4,1652)
1652    FORMAT(' ',T6,'ENTER NUMBER OF RAIDS IN I2 FORMAT.')
        READ(5,1697)I2
1697    FORMAT(I2)
        NSRT=I2
        GO TO 659
653     CONTINUE
        WRITE(4,1653)
1653  FORMAT(' ',T6,'ENTER PASSES PER SORTIE IN REAL NUMBER FORMAT.')
        READ(5,1202)V1
        XNPASS=V1
        GO TO 659
654     CONTINUE
        WRITE(4,1654)
1654    FORMAT(' ',T6,'ENTER THE MAX NUMBER OF SORTIES FOR REPAIR IN I
    +2 FORMAT.')
        READ(5,1697)I2
        NS=I2
        GO TO 659
699     CALL FRTCMS('CLRSCRN ')
     CALL CAMP( AAL,AAH,AAC,PKHAAG,PSAG,
    &           AAL,AAH,AAC,PKHAAM,PSAM,  SAML,SAMH,SAMD,PKHSM,PSSM,
```

```
     & ACR1,NSRT,XNPASS,NS,          ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
      WRITE (4,1699)ACR2,TOTSR,TOTACK,TOTACL,TOTACR
1699  FORMAT(' ','      RESULTS FROM CAMPAIGN AGAINST THE THREATS'//
     +T6,'     A/C READY FOR NEXT SORTIE',T41,F6.0/
     +T6,'     SORTIES FLOWN           ',T41,F8.0/
     +T6,'     TARGETS ATTACKED        ',T41,F8.0/
     +T6,'     AIRCRAFT LOST           ',T41,F6.0/
     +T6,'     AIRCRAFT IN REPAIR      ',T41,F6.0//
     +T6,'TO RETURN TO CAMPAIGN ANALYSIS ENTER 1 '/
     +T6,'TO RETURN TO MENU (6) ENTER 0')
      READ(5,1211)I1
       IF(I1.EQ.1) GO TO 650
       GO TO 150
C*********************************************************************
C     HELP
C*********************************************************************
9971      CALL FRTCMS('CLRSCRN ')
      WRITE(4,7971)
7971  FORMAT(' ','                       HELP FOR MENU 1              '/
     +T6,' THE VISAP DESIGN EVALUATOR IS DIVIDED INTO FIVE SECTIONS. '/
     +T6,'      THE AIRCRAFT DESIGN SECTION IS WHERE A DESCRIPTION OF'/
     +T6,' THE AIRCRAFT IS ENTERED. THIS INCLUDES GENERAL PARAMETRIC'/
     +T6,' SIZING VALUES AS WELL AS DESCRIPTIONS OF THE S/V FEATURES'/
     +T6,' CONTAINED IN THE DESIGN. VALUES SHOWN INITIALLY ARE DEFAULT'/
     +T6,' VALUES WHICH MAY BE CHANGED.'/
     +T6,'      THE MISSION SECTION IS WHERE THE MISSION PARAMETERS AND'/
     +T6,' THREAT INTENSITY VALUES ARE ENTERED. NOTE THAT THE TYPE'/
     +T6,' OF THREATS CANNOT BE CHANGED BECAUSE THE SELECTION OF THE'/
     +T6,' AIRCRAFT DETERMINES THE THREATS.                         '/
     +T6,'      THE LAST THREE SECTIONS ARE FOR EVALUATION OF THE'/
     +T6,' DESIGN. IF THE DESIGN AND THREAT SECTIONS ARE NOT ENTERED'/
     +T6,' DEFAULT VALUES (BASELINE) WILL BE USED FOR ALL CALCULATIONS.'
     +,//T6,'           ENTER ANY INTEGER TO RETURN TO MENU 1       ')
      READ(5,*)IJK
      GO TO 100
9972      CALL FRTCMS('CLRSCRN ')
      WRITE(4,7972)
7972  FORMAT(' ','                       HELP FOR MENU 2              '/
     +T6,' THE DESIGN SECTION IS DIVIDED INTO THREE SUBSECTIONS.'/
     +T6,'      THE AIRCRAFT PERFORMANCE INDICATORS AFFECT THE '/
     +T6,' ABILITY OF THE AIRCRAFT TO MANEUVER AND AVOID THE THEAT.'/
     +T6,' SOME OF THE VALUES MAY REMOVE THE AIRCRAFT FROM THE'/
     +T6,' THREAT ENVELOPE COMPLETELY. A FURTHER DISCUSSION OF THE '/
     +T6,' IMPACT OF THESE VALUES MAY BE FOUND IN THE P(H) SECTION'/
     +T6,' OF SUSCEPTIBILITY EVALUATION.                  '/
     +T6,'      SUSCEPTIBILITY REDUCTION FEATURES OF THE DESIGN ARE'/
     +T6,' ENTERED IN THIS SECTION. THESE INCLUDE JAMMER SIZE, RCS '/
     +T6,' REDUCTION LEVELS, CHAFF DISPENSER AND RADAR WARNING RE- '/
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     +T6,' CEIVER. THE DEFAULT VALUES (BASELINE) ARE ZERO, INDICATING'/
     +T6,' NONE OF THESE FEATURES ARE INCLUDED.                          '/
     +T6,'      VULNERABILITY REDUCTION FEATURES VARY WITH THE THREE'/
     +T6,' TYPES OF AIRCRAFT. SELECT THOSE FEATURES THAT BEST'/
     +T6,' DESCRIBE YOUR DESIGN. MINIMUM VALUES OF 1 (BASELINE)'/
     +T6,' INDICATE NO IMPROVEMENTS.                                    '//
     +T6,'          ENTER ANY INTEGER TO RETURN TO MENU 2              ')
      READ(5,*)IJK
      GO TO 110
9973     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7973)
7973  FORMAT(' ','                       HELP FOR MENU 3             '/
     +T6,' THE COMBAT SCENERIO SECTION IS DIVIDED INTO TWO SUBSECTIONS.
     +'/,T6,'     IN MISSION PROFILE, VALUES ARE ENTERED TO SPECIFICALLY
     +',T6,' DEFINE THE DESIRED MISSION. THE MISSION PARAMETERS ARE DEFI
     +NED'/,T6,' BY THE SELECTION OF AIRCRAFT TYPE. THESE INCLUDE ITEMS'
     +/,T6,' THAT MIGHT BE CONSIDED AS TACTICS.                       '/
     +T6,'      IN THREAT SELECTION, THREAT DENSITIES AND THREAT'/
     +T6,' DIAMETERS ARE ENTERED.  THE THREATS FOR THE FIGHTER ESCORT'/
     +T6,' MISSION ARE; AIR-TO-AIR GUNS, AIR-TO-AIR IR MISSILES, AND'/
C- #2 ---------------------------------------------------------------
     +T6,' LOW ALTITUDE SAM''S.'//
     +T6,'         ENTER ANY INTEGER TO RETURN TO MENU 3              ')
      READ(5,*)IJK
      GO TO 120
9974     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7974)
7974  FORMAT(' ','                       HELP FOR MENU 4             '/
     +T6,' THE SUSCEPTIBILITY ASSESSMENT SECTION HAS TWO SUBSECTIONS.'/
     +T6,'      THE PROBABILITY OF DETECTION IS AFFECTED BY THE'/
     +T6,' RCS OF THE AIRCRAFT, THE POWER OF THE NOISE JAMMER, '/
     +T6,' AND THE SLANT RANGE FROM THE THREAT TO THE A/C AT CPA.'/
     +T6,' NOTE THAT ALL AIRCRAFT ARE CONSIDERED TO PASS OVER A POINT'/
     +T6,' THAT IS THE SAME HORIZONTAL DISTANCE FROM THE THREAT '/
     +T6,' AS THE ALTITUDE OF THE AIRCRAFT. THIS MEANS THAT THE'/
     +T6,' CPA SLANT RANGE IS 1.414 TIMES THE ALTITUDE.'/
     +T6,'      THE PROBABILITY OF HIT IS DEFINED SEPARATELY FOR EACH'/
     +T6,' AIRCRAFT AND THREAT. HOWEVER, THE FORM IS CONSISTENT, WHERE'/
     +T6,' P(H) REFERS TO THE PROBABILITY THAT A NON-MANEUVERING A/C'/
     +T6,' WOULD BE HIT BY THE THREAT, F(M) IS THE MANEUVER FACTOR.'/
     +T6,' AND F(C) IS THE COUNTERMEASURE (CHAFF OR FLARE) FACTOR.'//
     +T6,'              P(H)'' = P(H) * F(M) * F(C)                 '//
     +T6,'          ENTER ANY INTEGER TO RETURN TO MENU 4              ')
      READ(5,*)IJK
      GO TO 130
9975     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7975)
7975  FORMAT(' ','                          HELP FOR MENU 5         '/
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     +T6,'       THE VULNERABILITY ASSESSMENT SECTION CALCULATES  '/
     +T6,' EITHER THE P(K/H) OR THE AVERAGE VULNERABLE AREA FOR THE '/
     +T6,' AIRCRAFT VERSUS A THREAT. FOR THE ESCORT AIRCRAFT;    '//
     +T6,' VS A/A GUNS                                            '/
     +T6,'    AV  = REGRESSION FORMULA THAT IS A FUNCTION   '/
     +T6,'          OF VULNERABILITY FEATURE INPUTS       '/
     +T6,'    AP = REGRESSION FORMULA THAT IS A FUNCTION      '/
     +T6,'         OF MISSION AND A/C PERFORMANCE INPUT DATA.  '/
     +T6,'    P(K/H) = AV/AP                                 '/
     +T6,' VS A/A IR MISSILE                                 '/
     +T6,'    P(K/H) = FROM A TABLE BASED UPON                 '/
     +T6,'      AP = ASSUMED SAME AS AP VS A/A GUNS (604 SQFT DEFAULT)'/
     +T6,'      AV  = P(K/H)*AP                               '//
     +T6,' VS LOW ALTITUDE SAM                                 '/
     +T6,'    P(K/H) = FROM A TABLE BASED UPON                 '/
     +T6,'      AP = ASSUMED SAME AS AP VS A/A GUNS (604 SQFT DEFAULT)'/
     +T6,'      AV  = P(K/H)*AP                               '//
     +T6,'         ENTER ANY INTEGER TO RETURN TO MENU 5          ')
      READ(5,*)IJK
      GO TO 140
9976     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7976)
7976  FORMAT(' ','                        HELP FOR MENU 41       '/
     +T6,'       THE FOLLOWING METHODS ARE USED FOR THE ESCORT P(D)'//
     +T6,'   VS A/A GUNS/MISSILE                                     '/
     +T6,'       P(D) = 1.                                  '/
     +T6,'   VS SAM                                                '/
     +T6,'       P(D) = TWO TIMES THE INTEGRAL OF THE GAUSSIAN       '/
     +T6,'            PROBABILITY FUNCTION FROM INFINITY TO CPA'//
     +T6,'         ENTER ANY INTEGER TO RETURN TO MENU 41         ')
      READ(5,*)IJK
      GO TO 410
9977     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7977)
7977  FORMAT(' ','                        HELP FOR MENU 42        '/
     +T6,'       THE FOLLOWING METHODS ARE USED FOR THE ESCORT P(H)'/
     +T6,'PH = PROBABILITY THAT A NON-MANEUVERING A/C IS HIT        '/
     +T6,'FA = PROBABILITY THAT THE CREW IS ALLERTED AND TAKE EVASIVE AC
     +TION.'/
     +T6,'FJ = IR JAMMER FACTOR        FS = IR SUPPRESSION FACTOR'/
     +T6,'FM = MANEUVER FACTOR         FF = IR FLARE FACTOR'/
     +T6,'WS = WING LOADING/100.       TW - THRUST TO WEIGH'//
     +T6,'   VS A/A GUNS                                             '/
     +T6,'        PH= .46168                   FA= 1.'/
     +T6,'        FM= 1+ 1.24038 * WS - 1.604 * TW'/
     +T6,'        PH'' = PH * (1. -(1.-FM)*FA)                 ')
      WRITE(4,79771)
79771  FORMAT(' ',T6,'   VS A/A IR MISSILE                '/
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     +T6,'        PH= .46168               FJ = .87 FF'/
     +T6,'        FA= 1.                   FS = .011 * 2**(TW/.2 -1.)'/
     +T6,'        FM=-.06056+2.54829*WS+.06043*TW**2-1.48552*WS**2'/
     +T6,'           -.25379*TW*WS'/
     +T6,'        PH'' = PH * FF * FJ * FS * (1. -(1.-FM)*FA)'//
     +T6,'    VS SAM                                                     '/
     +T6,'        PH = .33070        FC = .6                             '/
     +T6,'        FM = 1.-1.7  66 * TW**2 + 2.9794 * WS**2               '/
     +T6,'             -3.816 * WS**2 * TW**2                            '/
     +T6,'        PH'' = PH * FC * ( 1. - (1.- FM) * FA)                '//
     +T6,'           ENTER ANY INTEGER TO RETURN TO MENU 42              ')
      READ(5,*)IJK
      GO TO 420
9978     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7978)
7978  FORMAT(' ','                          HELP FOR MENU 6        '//
     +T6,'THE P(S) VS INCIVIDUAL WEAPONS                    '/
     +T6,'          P(S) = 1 -  P(D) * P(H) * P(K/H)        '//
     +T6,'THE P(S) FOR A SINGLE SORTIE                       '/
     +T6,'     W = WEIGHTING FACTOR             XL = PENETRATION DISTANCE'/
     +T6,'     XH = THREAT DENSITY               DL = THREAT DIAMETER     '/
     +T6,'     AH = A/C HIT     XK = A/C KILLED    AD = A/C DAMAGED      '/
     +T6,'     ACOVER = A/C OVER TARGET          ATAC = TARGETS ATTACKED '/
     +T6,'     PSM = PRCB. OF MISS. SURVIVAL  ACR1 = A/C IN FORMATION'//
     +T6,'     W = XL * XH * D / 100.        PSM = PS ** W     '/
     +T6,'     PH = (1. - PSM)/PKH             H1 = ACR1 * PH    '/
     +T6,'     XK1 = H * PKH                   A1 = H1 - XK1     '/
     +T6,'     ACOVER = ACR1-H1-H2-H3          ATAC = ACOVER * XNPAS '/
     +T6,'     H4 = ACOVER * PH                XK4 = H4 * PKH      '/
     +T6,'     A3 = H4 - XK4                   ACNHT = ACR1-H1-H4    '/
     +T6,'     ACDAM = A1 + A4                 ACKIL = XK1 + XK4     '//
     +T6,'           ENTER ANY INTEGER TO RETURN TO MENU 6            ')
      READ(5,*)IJK
C- #3 ----------------------------------------------------------------------
      GO TO 150
C- #5 ----------------------------------------------------------------------
C ******************* PLOTTING INFORMATICN ***************************
 8888 CALL FRTCMS('CLRSCRN ')
      WRITE(4,8889)
 8889 FORMAT(' ','            HELP FOR MENU (8)       '//
     *T6,'MENU (8) INCCRPORATES A DATA GENERATING ROUTINE TO SAVE'/
     *T6,'THE PROBABILITIES CF A KILL ( P(K) = 1 - P(S) ) FOR'/
     *T6,'LATER PLOTTING.  THIS PLOT MAY BE OBTAINED FROM A'/
     *T6,'TEKTRONIX DUAL SCREEN (TEK618) SYSTEM.  THE P(K)'/
     *T6,'AGAINST THE APPROPRIATE THREAT TYPES ARE PRESENTED.'//
     *T6,'    THREE DESIGNS CAN BE PLOTTED AT A TIME, FOR EXAMPLE'/
     *T6,'YOUR BASELINE CESIGN, YOUR FIRST DESIGN, AND CNE OTHER'/
     *T6,'MCDIFICATION.  YOL MUST HAVE DCNE AND CHCSEN TO SAVE'/
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     *T6,'PLCTTING DATA FRCM THREE RUNS.'//
     *T6,'     TO CBTAIN THE PLOT, FCLLOW THE SAME LOGON AND LINK'/
     *T6,'PRCCEDURES YOU UTILIZED TO ACCESS VISAP, HOWEVER, ENTER'/
     *T6,'DISVIS INSTEAD OF VISAP. THEN ENTER ESCPLT.'//
     *T6,'       ENTER ANY INTEGER TC RETURN TO MENU (8)')
      READ (5,*)IJK
      GO TO 8
C*******************************************************************
C          TRANSFER
C*******************************************************************
998      CALL FRTCMS('CLRSCRN ')
      WRITE(4,1998)
1998  FORMAT(' ','TRANSFER MENU, SELECT A CODE AS FOLLOWS:'/
     +T6,'MAIN MENU                          ',T41,'MM'/
     +T6,'  AIRCRAFT DESIGN SELECTION        ',T41,'DE'/
     +T6,'    A/C PERFCRMANCE INDICATORS     ',T41,'AP'/
     +T6,'    SUSCEPTIBILITY FEATURES        ',T41,'SF'/
     +T6,'    VULNERABILITY FEATURES         ',T41,'VF'/
     +T6,'  COMBAT SCENARIO SELECTION        ',T41,'MS'/
     +T6,'    MISSION PRCFILE                ',T41,'MP'/
     +T6,'    THREAT SELECTICN               ',T41,'TH'/
     +T6,'  SUSCEPTIBILITY ASSESSMENT        ',T41,'SA'/
     +T6,'    PROBABILITY OF DETECTICN       ',T41,'PD'/
     +T6,'    PROBABILITY OF HIT             ',T41,'PH'/
     +T6,'  VULNERABILITY ASSESSMENT         ',T41,'VA')
      WRITE(4,19981)
19981 FORMAT(' ',
     +T6,'    P(K/H) VS A/A GUNS             ',T41,'KG'/
     +T6,'    P(K/D) VS A/A MISSILE          ',T41,'KM'/
     +T6,'    P(K/D)                         ',T41,'KD'/
     +T6,'  SURVIVABILITY ASSESSMENT         ',T41,'SV'/
     +T6,'    P(S) 1:1 A/A (GUNS)            ',T41,'AG'/
     +T6,'    P(S) 1:1 A/A (IR MISSILE)      ',T41,'AM'/
     +T6,'    P(S) 1:1 LOW ALT SAM           ',T41,'LS'/
     +T6,'    SINGLE SCRTIE                  ',T41,'SS'/
     +T6,'    CAMPAIGN EVALUATION            ',T41,'CE'/
     +T6,'TC EXIT CR PRINT RESULTS             ',T41,'EX'/)
      READ(5,2000) K9Q
      IF(K9Q.EQ.K1(1)) GO TO 110
      IF(K9Q.EQ.K1(2)) GO TO 120
      IF(K9Q.EQ.K1(3)) GO TO 130
      IF(K9Q.EQ.K1(4)) GO TO 140
      IF(K9Q.EQ.K1(5)) GO TO 150
      IF(K9Q.EQ.K2(1)) GO TO 210
      IF(K9Q.EQ.K2(2)) GO TO 220
      IF(K9Q.EQ.K2(3)) GO TO 230
      IF(K9Q.EQ.K3(1)) GO TO 310
      IF(K9Q.EQ.K3(2)) GO TO 320
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      IF(K9Q.EQ.K4(1)) GO TO 410
      IF(K9Q.EQ.K4(2)) GO TO 420
      IF(K9Q.EQ.K5(1)) GO TO 510
      IF(K9Q.EQ.K5(2)) GO TO 520
      IF(K9Q.EQ.K5(3)) GO TO 530
      IF(K9Q.EQ.K6(1)) GO TO 610
      IF(K9Q.EQ.K6(2)) GO TO 620
      IF(K9Q.EQ.K6(3)) GO TO 630
      IF(K9Q.EQ.K6(4)) GO TO 640
      IF(K9Q.EQ.K6(5)) GO TO 650
      IF(K9Q.EQ.KK(3)) GO TO 999
      IF(K9Q.EQ.K1(6)) GO TO 100
      WRITE(4,1200)
      GO TO 998
C*****************************************************************
C           OUTPUTS AND EXIT
C*****************************************************************
C- #3 ------------------------------------------------------------
1061        CONTINUE
C*****************************************************************
C           FIND TOGW OF AIRCRAFT
C*****************************************************************
          CALL ESRWT(B,W,DL,EC,ED,EL,TW,WS,WT,XL,ICA,ICS,IEA,
     @    IEP,IFE,IFS,IFV,JAM,IRCS,XMDA,XMDM,XMDD,IRJAM,IRSUP,IWARN,
     @    ICHAFF,IRFLAR,BLTOGW,TOGW)
C- #3 ------------------------------------------------------------
C********** TO SAVE DATA ***********************
      REWIND 1
      WRITE(1,1012)TW,WS,WT,B,XL,W,EC,ED,EL,DL,JAM,IRCS,IWARN,ICHAFF,
     *     IRJAM,IRFLAR,IRSUP,IFS,
     *     IFV,IFE,IEA,IEP,ICS,ICA,XMDA,XMDM,XMDD,AAH,AAD,AAL,SAMH,
     *     SAMD,SAML,PDAAG,PDAAM,PDSM,PHG,PHM,PHSM,APAAG,AVAAG,
     *     PKHAAG,AVAAM,PKHAAM,VASM,PKHSM,
     *     PSAG,PSAM,PSSM,ACR,ACR1,NSRT,
     *     XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR,BLTOGW,TOGW
C
C- #3 ------------------------------------------------------------
      CALL FRTCMS('CLRSCRN ')
      WRITE (4,9200)TW,WS,WT,XMDA,AAH,XMDM,AAD,XMDD,AAL,SAMH,SAMD,SAML
      WRITE(4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IRJAM,IEP,
     +IRFLAR,ICS,IRSUP,ICA
      WRITE(4,9201)
      WRITE(4,9202)PSAG,PDAAG,PHG,PKHAAG
      WRITE(4,9203)PSAM,PDAAM,PHM,PKHAAM
      WRITE(4,9204)PSSM,PDSM,PHSM,PKHSM
      WRITE(4,9205)
      WRITE(4,9206)ACR1,NSRT,XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR
      WRITE(4,9207)BLTOGW,TOGW
```

```
      WRITE(4,9208)
      WRITE(4,9220)
      WRITE(4,9220)
      WRITE(4,9220)
      GO TO 8
C*****************************************************************
999      CONTINUE
        CALL FRTCMS('CLRSCRN ')
      WRITE(4,9999)
9999  FORMAT(' ',' TO PRINT YOUR RESULTS AND EXIT ENTER  "0"'/
     +,' TO PRINT YOUR RESULTS AND REENTER PRCGRAM ENTER "1"'/
     +,' TO EXIT WITHOUT A PRINT ENTER "2"')
      READ(5,*)IJK
      IF(IJK.EQ.2) GO TO 99999
C- #4 ------------------------------------------------------------
      WRITE (6,9200)TW,WS,WT,XMDA,AAH,XMDM,AAC,XMDD,AAL,SAMH,SAMD,SAML
      WRITE(6,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IRJAM,IEP,
     +IRFLAR,ICS,IRSUP,ICA
      WRITE(6,9201)
      WRITE(6,9202)PSAG,PDAAG,PHG,PKHAAG
      WRITE(6,9203)PSAM,PDAAM,PHM,PKHAAM
      WRITE(6,9204)PSSM,PDSM,PHSM,PKHSM
      WRITE(6,9220)
      WRITE(6,9205)
      WRITE(6,9206)ACR1,NSRT,XNPASS,NS,ACR2,TCTSR,TOTACK,TOTACL,TOTACR
      WRITE(6,9207)BLTCGW,TOGW
C
      IF(IJK.EQ.1) GO TO 1022
9220  FORMAT(' ')
C- #3,#4 ---------------------------------------------------------
9200  FORMAT('1',T25,'** FIGHTER ESCORT AIRCRAFT **'///
     *      T30,'* PERFORMANCE FEATURES'//
     *      ,'      THRUST TO WEIGHT',T30,F8.2,
     *      T42,'    WING LOADING',T65,F8.2/
     *      ,'      ORDNANCE WEIGHT',T30,F8.2///
     *      ,' * MISSION PARAMETERS',T40,' * THREAT PARAMETERS'//
     *      ,'      DASH ALTITUDE',T30,F8.2,
     *      T42,'    A/A DENSITY',T65,F8.2/
     *      ,'      DASH MACH NBR.',T30,F8.2,
     *      T42,'    A/A DIAMETER',T65,F8.2/
     *      ,'      DASH DISTANCE',T30,F8.2,
     *      T42,'    A/A PENETRATION DIST.',T65,F8.2/
     *      T42,'    SAM DENSITY',T65,F8.2/
     *      T42,'    SAM DIAMETER',T65,F8.2/
     *      T42,'    SAM PENETRATION DIST.',T65,F8.2//)
C- #3,#4 ---------------------------------------------------------
9201  FORMAT('0','           * SURVIVABILITY ASSESSMENT:'//
     *      T18,'P(S)      P(D)      P(H)      P(K/H)')
```

```
9202  FORMAT(' ',' VS A/A GUNS    ',4(F4.2,5X))
9203  FORMAT(' ',' VS A/A MISS    ',4(F4.2,5X))
9204  FORMAT(' ',' VS SAM         ',4(F4.2,5X))
9205  FORMAT('0','          * CAMPAIGN ANALYSIS:'/)
9206  FORMAT('0',' INITIAL A/C    ',F8.0,'      NUMBER OF RAIDS      ',I7,/
     +        '  PASSES/SORTIE ',F8.0,'      SCRTIES FOR REPAIR ',I5,/
     +        '  A/C READY     ',F8.0,'      TOTAL SORTIES        ',F8.0,/
     +        '  TCTAL TARGETS ',F8.0,'      TOTAL A/C LOST       ',F8.0,/
     +        '  IN REPAIR     ',F8.0)
9207  FORMAT('0',' BASELINE TOGW ',F10.2,T36,'ENHANCED TOGW ',F10.2)
9208  FORMAT('0',2('*********************************************************',/))
99999     STOP
          END
          SUBROUTINE ESRPDS(JAMS,IRCSS,PDF)
C*********************************************************************
C***** PROBABILITY OF CETECTION BY LOW ALTITUCE SAM *****************
C*********************************************************************
      DIMENSION H(2,7,6),F(101),PDT(101),XX(101)
      DATA H/
     @31.4,9.3,30.0,9.0,25.8,7.8,24.9,7.6,21.2,7.2,18.4,5.3,12.2,3.5,
     @15.0,4.2,13.8,4.0,10.2,3.1, 8.9,2.6, 7.1,2.1, 5.1,1.4, 2.4,.75,
     @10.6,3.1, 9.7,3.0, 7.2,2.1, 6.4,1.8, 4.9,1.4, 3.7,1.1, 1.5,.33,
     @ 7.5,2.2, 6.9,2.1, 5.2,1.4, 4.6,1.3, 3.4,.96, 2.6,.71, 0.1,0.0,
     @ 4.8,1.4, 4.3,1.3, 3.2,.96, 2.5,.71, 2.1,.63, 1.7,.54, 0.1,0.0,
     @ 3.6,1.1, 3.2,.96, 2.5,.71, 2.1,.63, 1.9,.59, 1.3,.38, 0.1,0.0/
          PDF = 0.
C****************** FOR ALL ALT .LT. 10,000 FT************************
          DSR=1.5
C****************** CANT USE ZERO AS AN INDEXIES*********************
      I=IRCSS+1
      J=JAMS+1
C****************** SELECTS PROPER MEAN AND DEVIATIONS***************
      X=H(1,I,J)
      S=H(2,I,J)
      IF(S.LT..01)S=.01
C******************* CONSTANTS FOR EASE OF WRITING*******************
      CON1=1./(S*SCRT(2.*3.14159))
      CON2=-.5/S**2
C*******************INTEGRATION START AT MEAN + 4 DEVIATIONS********
      XI=X+4.*S
C*******************100 STEPS IN ITEGRATION*************************
      STEP=-S/12.5
C****************** INITIAL VALUES TO START INTEGRATION**************
      F(1)=0.0
      XX(1)=XI
      PDF=0.
      PD=0.
C*******************INTEGRATION LOOP*********************************
```

```
      DO 10 JJ=1,1C0
            F(JJ+1)= CCN1*EXP(CON2*(XI-X)**2)
            XI=XI+STEP
            AREA=-.5*STEP*(F(JJ+1)+F(JJ))
            PDT(JJ+1)=PD
               IF(XI.LT.DSR)GO TO 5
                   PDF=PD
5              CONTINUE
            XX(JJ+1)=XI
            PD=PD+AREA
10       CONTINUE
C**********************SETS UP A MINIMUM PDF OF .1**********************
         IF(PDF.GT.0.1) GO TC 20
         PDF=.100
20         CONTINUE
         RETURN
         END
            SUBROUTINE ESRPHG(TWS,WS,PCAM)
C**************************************************************************
C************** P(H) FOR A/A GUNS ***************************************
C**************************************************************************
            PDAM = 0.
                WSS = WS/100.
                PH= .46168
                FA= 1.
                FM= 1.+ 1.24038 * WSS - 1.604 * TW
            XMF = 1. -(1.-FM)*FA
            PCAM = PH*XMF
            IF(PDAM.LT..C1)PDAM=.01
            RETURN
            END
            SUBROUTINE ESRPHM(TWS,WS,IRJAM,IRFLAR,IRSUP,PDAM)
C*************************************************************************
C************** PH FOR A/A IR MISSILE ****************************************
C*************************************************************************
            PDAM = C.
                WSS = WS/100.
                PH= .46168
C************** IR JAMMER FACTOR *************************************
        IF(IRJAM.EQ.1) PH = PH * .87
C************** IR SUPPRESSICN FACTOR ********************************
        IF(IRSUP.EQ.1) PH = PH * .011 * 2**(TW/.2 -1.)
C************** IR FLAIR FACTOR *************************************
        IF(IRFLAR.EC.1) PH = PH * .5
C************** ALERTICN FACTOR ************************************
                FA= 1.
C************** MANUEVER FACTOR ************************************
        FM=-.06056+2.54829*WSS+.06043*TWS**2-1.48652*WSS**2-.25379*TWS*WSS
```

```
          XMF = 1. -(1.-FM)*FA
          PDAM = PH*XMF
          RETURN
          END
          SUBROUTINE ESRPHS(IWARN,ICHAFF,XMA,WS,PDAM)
C****************************************************************
C***** PH FOR LOW ALTITUDE SAM ***********************************
C****************************************************************
          PDAM = 0.
           WSS = WS/100.
           XXMR = 3.29
              PH = .33070
          CALL SRFC (ICHAFF,FC)
C**************  MODIFIED FOR CHAFF *****************************
              PH1 = PH * FC
          CALL SRFA (XXMR,IWARN,FA)
C**************  MODIFIED FOR MANUVERING ************************
        FM = 1.-1.7  66*XMA**2+2.9794*WSS**2-3.816*WSS**2*XMA**2
C**************  SETS MINIMUM FM AT .01* ************************
        IF(FM.LT.0.01)FM = 0.01
              XMF = 1. - (1.- FM) * FA
          PDAM = PH1 * XMF
          RETURN
          END
         SUBROUTINE SRFC(ICHAFF,FC)
C****************************************************************
C****** CHAFF FACTOR ********************************************
C****************************************************************
         REAL PBTSM(17)
         DATA PBTSM/.00,.19,.35,.49,.6,.68,.74,.8,.83,.86,.9,.92,.935,
     A              .95,.96,.97,.98/
          FC = 0.
         PBTS=0.
         IF(ICHAFF.EQ.0) GO TO 10
C*********NUMBER OF BUNDLES DEFAULTED TO FOUR **********************
         NBUNDS = 4
         PBTS=PBTSM(NBUNDS+1)
10       FC = 1. - PBTS
         RETURN
         END
      SUBROUTINE SRFA(XXMRS,IWARN,FAS)
C*******************************************************************
C******* ALERTION FACTOR *******************************************
C*******************************************************************
      REAL MRM(28),FVM(28),FESM(12),MRSM(12)
         DATA FESM/1.,.99999,.97,.91,.82,.69,.53,.35,.22,.137,.065,0./
         DATA MRSM/0.,36.,40.,50.,60.,70.,80.,90.,100.,110.,120.,140./
      DATA MRM/0.,1.,1.94,2.,2.54,3.,3.08,3.48,3.78,4.,4.05,4.23
```

```
      A,4.35,4.45,4.55,4.68,4.8,4.9,5.05,5.35,5.8,6.,6.39,7.,7.36
      B,8.,9.,10./
       DATA FVM/1.,.995,.95,.943,.9,.868,.85,.8,.75,.712,.7,.65,.6
      A,.55,.5,.45,.4,.357,.35,.3,.25,.216,.2,.165,.15,.13,.114,.101/
       FES=0.
       FVS=0.
       FAS = C.
       IF(IWARN.EQ.1)GO TC 15
       KEY=1
5      CONTINUE
          KEY=KEY+1
       IF(MRM(KEY).LT.XXMRS) GO TO 5
       DELTAX=MRM(KEY)-MRM(KEY-1)
       DELTAY=FVM(KEY)-FVM(KEY-1)
       FVS=((XXMRS-MRM(KEY-1))/DELTAX)*DELTAY+FVM(KEY-1)
       FAS = FVS
       GO TO 20
15     CONTINUE
          J=1
10        CONTINUE
          J=J+1
          IF(XXMRS.GE.MRSM(J)) GO TO 10
          DX= MRSM(J-1)-MRSM(J)
          DY= FESM(J-1)-FESM(J)
          FES=((XXMRS-MRSM(J-1))/DX)*DY+FESM(J-1)
          FAS = FES
20      CONTINUE
          RETURN
          END
       SUBROUTINE ESRAVG(IFSS,IFVS,IFES,IEAS,IEPS,ICSS,ICAS,A,B,C,D,E,F,
      &AV,AP,PKH)
C*************************************************************************
C****** VULNERABLE AREA AND P(K/H) VS A/A GUNS *************************
C*************************************************************************
        DIMENSION XFE(8),XEA(2)
        DATA XFE/2.,3.,4.,6.,8.,12.,16.,32./
        DATA XEA/2.,1./
       AV = 0.
       AP = 0.
       PKH = 0.
       AF= 51.8325 - .0C0660995*A*C + 80.0319*A*D +.000026905*B*C
      &         -1.43074*B*D + .0000000105459*C*C - .00228477*C*D
      &         -.C000C651251*C*E + .636887*D*E + .0181204*D*F
      &         -.00143376*E*E -.0000026265*F*E
       AS= 1019.17 - .01405*C -1693.35*D -2.74121*A*B +462.21*A*D
      &         +.000171723*B*C +1.77235*B*D -.0314528*B*E
      &         +.C0000C038C012*C*C -.0000246121*C*E + 404.036*D*D
      &         +4.69676*D*E +.100098*D*F -.00352892*E*E
```

```
      AB= 1836.72 -25.1442*B +305.998*A*C +5.49718*A*E +.0679002*B*B
     &          +.000000134505*C*C -.0227707*C*D -.0000872573*C*E
     &          +.2092535*D*F -.00127764*E*F
      AP = ( AF + AS + AB ) / 3.
      WES = 16652. + 23272.2*A*D +.00048062*C*C -171.969*B*D
     &          -.27622*C*D +.0295446*E*F
      FRS = 67207.8 -163392.*D +7.17334*F -73.9527*A*B +10009.5*A*D
     &          +144.856*A*E +.0060909*B*C -.051024*B*F +.00000587143*C*C
C- #1 ---------------------------------------------------------------------
     &          -.858783*C*D -.00239668*C*E +105140.*D*D -.0262439*E*F
          FT = .6 * FRS
C************ SET UP VALUES ****************************************
          FS = FLCAT(IFSS)
          FV = FLCAT(IFVS)
          FE = XFE(IFES) * FT * .001
          EA = XEA(IEAS) * WES * .001
          EP = FLCAT(IEPS)
          CS = FLCAT(ICSS)
          CA = FLCAT(ICAS)
C************* CALCULATE VULNERABLE AREA ****************************
      AV      = 41.56 - 2.244*ALOG(FE) - 4.373*ALOG(FV) - 4.732*ALOG(FS)
     &            - 5.009*ALCG(CS) + 5.946*ALOG(EA) - 2.491*ALOG(CA)
     &            + 16.44*ALCG(FT*.001) - 47.503 * ALOG(EP)
C************* CALCULATE P(K/H) **************************************
          PKH     = AV/AP
       RETURN
       END
      SUBROUTINE ESRAVM(IFSS,IFVS,AP,AVMS,PKHSMS)
C*********************************************************************
C*********VULNERABLE AREA AND P(K/H) VS AA IR MISSILE ***************
C*********************************************************************
C************* SET UP VALUES *****************************************
          F1= 0.
          F2= 0.
          F3= 0.
          F4= 0.
          IF(IFSS.GE.3)                                    F1 = 1.
          IF((IFSS.NE.1).ANC.(IFSS.NE.3).AND.(IFSS.NE.6)) F2 = 1.
          IF((IFVS.EQ.3).OR.(IFVS.EQ.4).GR.(IFVS.EQ.6))   F3 = 1.
          IF((IFVS.EQ.5).OR.(IFVS.EQ.6))                  F4 = 1.
C************* CALCULATE PK/H VS SAM *********************************
            ITF = INT(F1+F2+F3+F4)
            GO TC (10,20,30,40),ITF
1              PKFSMS = .675
            GC TC 50
10             PKFSMS = F1*.671 + F2*.673 + F3*.648 + F4*.560
            GO TO 50
20             PKHSMS = F1*F2*.670 + F1*F3*.640 + F1*F4*.610 +
```

```
      &                  F2*F3*.644 + F2*F4*.616 + F3*F4*.485
             GO TC 50
30              PKHSMS = F1*F2*F3*.637 + F1*F2*F4*.606 +
      &                  F1*F3*F4*.448 + F2*F3*F4*.460
             GO TC 50
40              PKHSMS = .423
50           CONTINUE
C*********** CALCULATE VULN AREA VS SAM *************************
                AVMS = PKHSMS*AP
      RETURN
      END
      SUBROUTINE ESRAVS(IFSS,IFVS,AP,AV,PKHSAM)
C*****************************************************************
C************  VULNERABLE AREA VS LOW ALTITUDE SAM ***************
C*****************************************************************
C*********** SET UP VALUES ***************************************
          F1 = 0.
          F2 = 0.
          F3 = 0.
          F4 = 0.
           IF(IFSS.GE.3)                                   F1 = 1.
           IF((IFSS.NE.1).ANC.(IFSS.NE.3).AND.(IFSS.NE.6)) F2 = 1.
           IF((IFVS.EQ.3).OR.(IFVS.EQ.4).CR.(IFVS.EQ.6))   F3 = 1.
           IF((IFVS.EQ.5).OR.(IFVS.EQ.6))                  F4 = 1.
C*********** CALCULATE PK/H VS SAM *******************************
             ITF = INT(F1+F2+F3+F4)
             GC TC (10,20,3C,40),ITF
1               PKHSAM = .9934
             GO TC 50
10              PKHSAM = F1*.940 + F2*.964 + F3*.898 + F4*.789
             GO TC 50
20              PKHSAM = F1*F2*.928 + F1*F3*.711 + F1*F4*.880 +
      &                  F2*F3*.783 + F2*F4*.904 + F3*F4*.747
             GO TO 50
30              PKHSAM = F1*F2*F3*.633 + F1*F2*F4*.861 +
      &                  F1*F3*F4*.518 + F2*F3*F4*.494
             GO TC 50
40              PKHSAM = .292
50           CONTINUE
C*********** CALCULATE VULN AREA VS SAM *************************
                AV = PKHSAM * AP
      RETURN
      END
      SUBRCUTINE SORT(
C*******************************************************************
C****** SORTIE ANALYSIS ********************************************
C*******************************************************************
     &XL1,XH1,D1,PKH1,PS1,   XL2,XH2,C2,PKH2,PS2,  XL3,XH3,D3,PKH3,PS3,
```

```
     &ACR1,NSRT,XNPAS,NS,              ACR2,TCTSR,TOTACK,TOTACL,TOTACR)
      ACR2 = 0.
      TCTSR = 0.
      TOTACK = 0.
      TCTACL = 0.
      TCTACR = 0.
      ACCAM=0.
      W1 = XL1 * XH1 * D1 / 100.
      W2 = XL2 * XH2 * D2 / 100.
      W3 = XL3 * XH3 * D3 / 100.
C
      PSM1 = PS1 ** W1
      PSM2 = PS2 ** W2
      PSM3 = PS3 ** W3
C
      PH1 = (1. - PSM1)/PKH1
      PH2 = (1. - PSM2)/PKH2
      PH3 = (1. - PSM3)/PKH3
C******************INGRESS*********************************************
C***************THREAT 1**************
         H1 = ACR1 * PH1
         XK1 = H1 * PKH1
         A1 = H1 - XK1
C***************THREAT 2**************
           H2 = (ACR1-H1) * PH2
           XK2 = H2 * PKH2
           A2 = H2 - XK2
C***************THREAT 3**************
             H3 = (ACR1-H1-H2) * PH3
             XK3 = H3 * PKH3
             A3 = H3 - XK3
C***************OVER TARGET**************
          ACOVER = ACR1-H1-H2-H3
          ATAC = ACOVER * XNPAS
C****************EGRESS****************
C***************THREAT 1**************
         H4 = ACCVER * PH1
         XK4 = H4 * PKH1
         A4 = H4 - XK4
C***************THREAT 2**************
           H5 = (ACCVER-H4) * PH2
           XK5 = H5 * PKH2
           A5 = H5 - XK5
C***************THREAT 3**************
C- #1 ------------------------------------------------------------------
             H6 = (ACCVER-H4-H5) * PH3
             XK6 = H6 * PKH3
             A6 = H6 - XK6
```

```
C***************TOTALS FOR SORTIE********
                 ACNHT = ACR1-H1-H2-H3-H4-H5-H6
                 ACDAM = A1 + A2 + A3 + A4 + A5 + A6
                 ACKIL = XK1 + XK2 + XK3 + XK4 + XK5 + XK6
C**************FOR NEXT SORTIE**********
                      ACR2 = ACNHT
                      TOTSR = ACR1
                      TOTACK = ATAC
                      TOTACL = ACKIL
                      TOTACR = ACDAM
      RETURN
        END
       SUBROUTINE CAMP(
     &XL1,XH1,D1,PKH1,PS1,   XL2,XH2,D2,PKH2,PS2,  XL3,XH3,D3,PKH3,PS3,
     &ACR1,NSRT,XNPAS,NS,            ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
C***********************************************************************
C       XL-PENDIS     H-THREAT DENSITY     D- THREAT DIAMETER
C
C***********************************************************************
        INTEGER NSRT,NS
       DIMENSION ACR(200)
         TOTSR  = 0.
         TOTACK = 0.
         TOTACL = 0.
         TOTACR = 0.
         ACDAM=0.
C
       W1 = XL1 * XH1 * D1 / 100.
       W2 = XL2 * XH2 * D2 / 100.
       W3 = XL3 * XH3 * D3 / 100.
C
       PSM1 = PS1 ** W1
       PSM2 = PS2 ** W2
       PSM3 = PS3 ** W3
C
       PH1 = (1. - PSM1)/PKH1
       PH2 = (1. - PSM2)/PKH2
       PH3 = (1. - PSM3)/PKH3
C
      ACR(1)= ACR1
      DO 10 I = 1,NSRT
C***************INGRESS*****************
            H1 = ACR(I) * PH1
            XK1 = H1 * PKH1
            A1 = H1 - XK1
               H2 = (ACR(I)-H1) * PH2
               XK2 = H2 * PKH2
               A2 = H2 - XK2
```

```
                  H3 = (ACR(I)-H1-H2) * PH3
                  XK3 = H3 * PKH3
                  A3 = H3 - XK3
C***************OVER TARGET*************
              ACOVER = ACR(I)-H1-H2-H3
              ATAC = ACOVER * XNPAS
C***************EGRESS******************
             H4 = ACOVER * PH1
             XK4 = H4 * PKH1
             A4 = H4 - XK4
                H5 = (ACOVER-H4) * PH2
                XK5 = H5 * PKH2
                A5 = H5 - XK5
C- #1 -----------------------------------------------------------------
                  H6 = (ACOVER-H4-H5) * PH3
                  XK6 = H6 * PKH3
                  A6 = H6 - XK6
C***************TOTALS FOR SORTIE********
              ACNHT = ACR(I)-H1-H2-H3-H4-H5-H6
              ACDAM = A1 + A2 + A3 + A4 + A5 + A6
              ACKIL = XK1 + XK2 + XK3 + XK4 + XK5 + XK6
C***************FOR NEXT SORTIE***********
                   TOTACR = TOTACR+ACDAM
                   ACROUT = TOTACR/FLOAT(NS)
                   TOTACR = TOTACR-ACROUT
                   ACR(I+1) = ACNHT + ACROUT
                   ACR2 = ACR(I+1)
                   TOTSR = TOTSR + ACR(I)
                   TOTACK = TOTACK + ATAC
                   TOTACL = TOTACL + ACKIL
10          CONTINUE
          RETURN
            END
            SUBROUTINE ESRWT(SPAN,W,DL,EC,ED,EL,TW,WS,WT,XL,ICA,ICS,IEA,
C********************************************************************
C********* TOGW CALCULATION SUBROUTINE ******************************
C********************************************************************
     @      IEP,IFE,IFS,IFV,JAM,IRCS,XMDA,XMDM,XMDD,IRJAM,IRSUP,IWARN,
     @      ICHAFF,IRFLAR,BLTOGW,TOGW)
            REAL A,B,C,D,E,F,G,H,I,J
            A = TW
            B = WS
            C = XMDA
            D = XMDM
            E = XMDC
            F = WT
            G = 0.
            H = 0.
```

```
      I = 0.
      J = 0.
C*****************************************************************
      BLTOGW   = .223614E+05 - .324752E+01*H -.949382E+05*J -.25362*A*C
     @+.241287E+05*A*D +.214144E+03*A*E  +.36411E+01*A*H +.51498E+05*A*I
     @+.130783E-01*B*C-.46815E+03*B*C -.237024E+05*B*G +.691265E-05*C*C
     @-.118548E+01*C*D -.483582E-02*C*E -.296972E+02*C*G+.147131E+05*D*D
     @+.108228E+02*D*F +.612094E+07*D*G +.366191E+01*D*H-.550071E+05*D*I
     @+.148915E+06*D*J -.238375E-01*E*F+.152377E+05*E*G +.907909E-02*E*H
     @-.378503E+03*E*I +.359190E+03*E*J-.917125E-03*F*F -.205186E+04*F*G
     @+.165260E+08*G*G +.111890E+03*G*H-.265987E+07*G*I  +.592438E+07*G*J
     @-.637399E-04*H*H +.620790E+01*H*J

C*******************************************************************
C        A/C TOGW CF CESIGN WITH SURVIVABILITY ENHANCEMENT
C*******************************************************************
C         THE FOLLCWING ASSUMPTION MACE;
C               ALL SELF-SEALING DONE FCR 23 MM
C               TWO WING TANKS, FOUR FUSELAGE TANKS, PLUS SUMP TANK(S)
C               DUAL SUMP TANKS HAVE EQUAL VCLUMN OF SINGLE SUMP TANK
C               EACH TANK HOLDS 1/7 OF TOTAL VCLUMN
C               INTERNAL FOAM USE VICE ULLAGE INERTING
C               FIRE EXTINGUSHING VICE EXTERNAL FOAM
C*******************************************************************
            IF(JAM.EQ.0) GO TO 40
               G = .8675 * WS / BLTOGW
40          CONTINUE
C??????????????????????????????????????????????????????????????????*
C***      TEMP FIX CN G ***********************************************
               G=C.
            IF(IRSUP.NE.2) GC TO 50
               I = .05
               J = .05
50          CONTINUE
C*******************************************************************
C       WEIGHT INCREASE CALCULATIONS
C*******************************************************************
C*******   FR = FUEL REQUIRED FOR MISSION *****************************
         FR =.672078E+05 -.163392E+06*D +.717334E+01*F-.782443E+05*I
     @-.739527E+02*A*B +.100095E+05*A*D +.144856E+03*A*E+.159256E+01*A*H
     @+.476609E+05*A*I -.431972E+05*A*J +.609094E-02*B*C-.510240E-01*B*F
     @-.238850E+05*B*G +.587143E-05*C*C -.858783E+00*C*D-.239668E-02*C*E
     @-.273454E+02*C*G -.153966E-04*C*H +.951930E+00*C*I+.105140E+06*D*D
     @+.265033E+07*D*G +.698039E+05*D*J -.262439E-01*E*F+.646932E+04*E*G
     @+.265667E+03*E*J +.170282E+08*G*G +.426677E+02*G*H-.232114E+07*G*I
     @+.281936E+07*G*J -.184747E-04*H*H +.314433E+01*H*J
C******* WEIGHT INCREASE DUE TO SELF-SEALING **************************
          XNT = 2.
```

```
      IF((IFS.EQ.1).OR.(IFS.EQ.3).OR.(IFS.EQ.6)) XNT = 0.
      IF(IFS.EQ.2) XNT = 1.
   WSSP = 1.49*(2.2*8./7.-1.)*(1./7.)**.75*(FR/6.6)**.64*XNT**.11
C******* WEIGHT INCREASE DUE TO INTERNAL FOAM ***********************
   WF = 0.
      IF((IFV.EQ.4).OR.(IFV.EQ.6)) WF = .0186 * FR/6.6
C******* WEIGHT INCREASE DUE TO FIRE EXTINGUISHING ******************
   WFE = 0.
      XV = 4./3. * ( ED + 1.) * ED * EL
      IF((IFV.EQ.5).OR.(IFV.EQ.6)) WFE = 10.5 * XV**.26
C******* WEIGHT INCREASE DUE TO DUCT PROTECTION *********************
   XND = 1.
   WBB= 0.
   IF(IFE.EQ.2) XND = 2.
   XS = CL * EC * XND * .5
   IF((IFE.EQ.2).OR.(IFE.EQ.4).OR.(IFE.EQ.6)) WBB = 7.6 * XS
C******* WEIGHT INCREASE DUE TO ARMOR *******************************
   AD = 0.
      IF(ICA.EQ.2) AD = 10.
      IF((ICA.EQ.3).OR.(ICA.EQ.4)) AC = 18.
      IF((ICA.EQ.5).OR.(ICA.EQ.6)) AC = 30.
      WARM = 12. * AD
C******* WEIGHT INCREASE DUE TO ENGINE SEPERATION*******************
      XEB = 0.
      IF(IEA.EQ.1) XEB = 0.
      IF(IEA.EQ.2) XEB = 4.
      IF(IEP.EC.2) XEB = 6.
      XA = ED/2. * 12.
      XT = TW * ( BLTOGW - FR ) * .5
      XH = 1.23 * XA
      XN = 11.
      WENG = 2000.
C- #1 ---------------------------------------------------------------
     WES =(1.264 + .034 * XA * XT * XH)*(WENG * XN * XA * XEB *1.0E-10)
C******* WEIGHT INCREASE DUE TO RAM ********************************
      XTT = .1
      XS = 0.
      IF(IRCS.EQ.1) XS = 10.
      IF((IRCS.EQ.2).OR.(IRCS.EQ.3)) XS = 20.
      IF(IRCS.EQ.4) XS = 60.
      IF(IRCS.EQ.5) XS = 60. + BLTOGW/WS *.69
      IF(IRCS.EQ.6) XS = 75. + BLTOGW/WS *.69
      WRAM = XTT * XS * 23.8
C******* WEIGHT INCREASE DUE TO REDUNDANT CONTROLS ******************
      BACKUP = 0.
      IF((ICS.EQ.3).CR.(ICS.EQ.4)) BACKUP = 1.
      XLGP = W + EC + SPAN + XL / 2.
      WRED = BACKUP * (2.207 * XLGP  - 4.79)
```

```
C******* WEIGHT INCREASE DUE TO RWR ***********************************
         WEW = 0.
         IF(IWARN.EQ.1) WEW = 50.
C******* WEIGHT INCREASE DUE TO RADAR JAMMER **************************
         WJW = 0.
         IF(JAM.EC.1) WJW = 80.
         IF(JAM.EC.2) WJW = 100.
         IF(JAM.EC.3) WJW = 200.
         IF(JAM.EC.4) WJW = 500.
         IF(JAM.EC.5) WJW = 1000.
C******* WEIGHT INCREASE DUE TO CHAFF DISPENSER ***********************
         WCC = 0.
         IF(ICHAFF.EQ.1) WCC = 86.
C******* WEIGHT INCREASE DUE TO IR FLARE CISPENSER ********************
         WFC = 0.
         IF(IRFLAR.EQ.1) WFC = 86.
C******* WEIGHT INCREASE DUE TO SUBMERGED STORE ***********************
         WSOR = 0.
         IF((IRCS.EQ.5).OR.(IRCS.EQ.6)) WSOR = 1.13 * WT/100.
C******* WEIGHT INCREASE DUE TO COOLED IR PLUG ***********************
         WPLG = 0.
         IF(IRSUP.EQ.2) WPLG = .01012 * EC**2
C******* WEIGHT INCREASE DUE TO AEROSOL INJECTER *********************
         WAI = 0.
         IF(IRSUP.EQ.1) WAI = 200.
C******* WEIGHT INCREASE DUE TO IR JAMMER ****************************
         WIRJ = 0.
         IF(IRJAM.EQ.1) WIRJ = 200.
C*********************************************************************
C******* TOTAL WEIGHT INCREASE ***************************************
        H =  WSSP+WF+WFE+WBB+WARM+WES+WRAM+WRED+WEW+WJW+WCD+WFD
     @       +WSOR+WPLG+WAI+WIRJ
C*********************************************************************
C******* TOTAL TOGW OF ENHANCED A/C***********************************
C*********************************************************************
        TOGW= .223614E+05 - .324752E+C1*H -.949382E+05*J -.25362*A*C
     @+.241287E+05*A*D +.214144E+03*A*E +.36411E+01*A*H +.51498E+05*A*I
     @+.130783E-01*B*C-.46815E+03*B*C -.237024E+05*B*G +.691265E-05*C*C
     @-.118548E+01*C*D -.483582E-02*C*E -.296972E+C2*C*G+.147131E+05*D*D
     @+.108228E+02*D*F +.612094E+07*D*G +.366191E+01*D*H-.55J071E+05*D*I
     @+.148915E+06*D*J -.238375E-01*E*F+.152377E+05*E*G +.907909E-02*E*H
     @-.378503E+03*E*I +.359190E+03*E*J-.917125E-03*F*F -.205186E+04*F*G
     @+.165260E+08*G*G +.111890E+03*G*H-.265987E+07*G*I +.592438E+07*G*J
     @-.637399E-04*H*H +.620790E+01*F*J
         RETURN
         END
```

```
C*********************************************************************
C**                                                                 **
C**     ESCPLT < ESCCRT PLT >                                       **
C**     PROGRAM TO GRAPH P(K)'S VS. THREATS AGAINST                 **
C**     FIGHTER ESCORT AIRCRAFT                                     **
C**                                                                 **
C*********************************************************************
      DIMENSION YO(3),Y1(3),Y2(3),Y3(3),XO(3),IPKRAY(400)
     *          ,LABEL(20)
      DATA LABEL/' ',' ',' ',' ','A/A ','GUNS',' ',' ',
     *          'A/A ','MISS','ILE ',' ',
     *          'SAM ',' ',' ',' ',' ',' ',' ',' '/
      DATA Y0/0.,0.,0./
      DATA X0/1.,2.,3./
C
      READ(7,700)(Y1(I),I=1,3),(Y2(I),I=1,3),(Y3(I),I=1,3)
  700 FORMAT(F4.2)
C
      CALL TEK618
      CALL HWROT('MOVIE')
      CALL BLOWUP (1.4)
      CALL PAGE(8.5,11.)
      CALL NOBRDR
      CALL AREA2D(6.,8.5)
      CALL XNAME('THREATS$',100)
      CALL YNAME('P(()K())$',100)
      CALL SWISSM
      CALL SHDCHR(90.,1,.003,1)
      CALL BASALF('STAND')
      CALL MIXALF('L/CSTD')
      CALL HEADIN('FIGHTER ESCORT AIRCRAFT$',100,1.5,2)
      CALL HEADIN('L(OSS) R(ATE) VS. T(HREAT) T(YPE)$',100,1.1,2)
      CALL YREVTK
      CALL YAXANG(0.)
      CALL XTICKS(0)
      CALL XAXEND('NOENDS')
      CALL YAXEND('NOLAST')
      CALL SWISSL
      CALL HEIGHT(.12)
      CALL FRAME
      CALL THKFRM(.10)
      CALL XLABGR(LABEL,4,5,0.,.1,1.1)
      CALL BLREC(0.01,8.1,4.29,0.6,0)
      CALL BLREC(4.3,7.7,1.7,1.0,0)
      CALL BLKEY(IC)
      CALL CLUSTR(3,.08)
      CALL HEIGHT(.08)
      CALL BARDOC('SECOND','OUTSIDE',2)
```

```
CALL  BLBAR
CALL  VBARS('LABEL',Y0,Y1,3)
CALL  VBARS('LABEL',Y0,Y2,3)
CALL  VBARS('LABEL',Y0,Y3,3)
CALL  HEIGHT(.05)
CALL  DOT
CALL  GRID(0,2)
CALL  RESET('DOT')
CALL  HEIGHT(.10)
CALL  BLOFF(IC)
MAXLIN=LINEST(IPKRAY,400,40)
CALL  LINES('B(ASELINE)$',IPKRAY,1)
CALL  LINES('1ST D(ESIGN)$',IPKRAY,2)
CALL  LINES('2ND D(ESIGN)$',IPKRAY,3)
CALL  LEGEND(IPKRAY,3,4.5,7.6)
CALL  ENDPL(0)
CALL  DONEPL
STOP
END
```

APPENDIX F

STRIKE AND STRPLT PROGRAM LISTINGS

```
C*****************************************************************************
C**                                                                         **
C**     STRIKE                                                              **
C**     PROGRAM TC ASSESS LCNG RANGE STRIKE AIRCRAFT SURVIVABILITY          **
C**                                                                         **
C*****************************************************************************
C
C             LCNG RANGE STRIKE AIRCRAFT
C
C  THESE LINE NUMBERS ARE FOR EASY REFERENCE
C       MAIN MENU                               1, 100, 1001
C       AIRCRAFT DESIGN SELECTION               2, 110, 1110
C           A/C PERFORMANCE INDICATOR S        21, 210, 1210
C           SUSCEPTIBILITY FEATURES            22, 220, 1220
C           JAMMERS 221  RCS 222  RWR 223   CHAFF 224
C           VULNERABILITY FEATURES             23, 230, 1230
C        COMBAT SCENARIC SELECTION              3, 120, 1120
C           MISSION PROFILE                    31, 310, 1310
C           THREAT SELECTION                   32, 320, 1320
C        SUSCEPTIBILITY ASSESMENT               4, 130, 1130
C           PROBABILITY OF DETECTION           41, 410, 1410
C           PROBABILITY OF HIT                 42, 420, 1420
C                 VS A/A (RADAR MISSILE)           421
C                 VS HIGH ALT SAM                  423
C         VULNERABILITY ASSESMENT               5, 140, 1140
C                 VULN AREA VS A/A MISSILE         510
C                 VULN AREA VS SAM                 520
C         SURVIVABILITY ASSESMENT               6, 150, 1150
C           P(S) 1:1 A/A (RADAR MISSILE)           610, 618
C           P(S) 1:1 HIGH ALT SAM                  630, 638
C           SINGLE SORTIE                          640, 1640
C           CAMPAIGN EVALUATICN                    650, 1650
C         HELP                                     997X
C         TRANFER                                  998
C         EXIT                                     999
C             SUBRCUTINE NAMES AND LINE NUMBERS
C            SSRPDA        475    1000
C            SSRPDS        496    1007
C            SSRPHR        538    1055
C            SSRPHS        560    1076
C            SRFA     1067/1085   1094
C            SRFC     1064/1082   1127
C            SSRAVA       580     1138
C            SSRAVS       603     1170
C            SORT         689     1237
C            CAMP         775     1297
      IMPLICIT REAL*4(A-H,O-Z),INTEGER*4(I-N)
C
```

```
      DIMENSION KK(4),K1(6),K2(3),K3(2),K4(2),K5(2),K6(4),
C- #5 -----------------------------------------------------------------
     *          JJ(2),PKAR(3),PKSM(3)
C
      DATA K1/'DE','MS','SA','VA','SV','MM'/
      DATA K2/'AP','SF','VF'/
      DATA K3/'MP','TH'/
      DATA K4/'FD','PH'/
      DATA K5/'KH','KD'/
      DATA K6/'AR','HS','SS','CE'/
      DATA KK/'HP','TN','EX','RT'/
C- #5 -----------------------------------------------------------------
      DATA JJ/'Y','N'/
C
C- #3 -----------------------------------------------------------------
C************ TO SAVE DATA ******************************************
C
      CALL FRTCMS('CLRSCRN ')
      WRITE(4,1010)
1010  FORMAT(' ','DATA MODE SELECTION, ENTER A CODE AS FOLLOWS:'//
     *T6,'IF THIS IS YOUR FIRST TIME THROUGH STRIKE OR IF YOU WISH'/
     *T6,'TO USE THE DEFAULT VALUES/PARAMETERS ENTER...0 '//
     *T6,'TO USE DATA SAVED FROM YOUR LAST RUN ENTER...1 '///
     *T20,'WARNING'//
     *T6,'--DO NOT ENTER 1 IF THIS IS YOUR FIRST RUN OR IF YOU HAVE'/
     *T6,'ERASED YOUR STRIKE DATA FILE FROM YOUR DISK--'/)
C
      READ(4,1011)I1
1011  FORMAT(I1)
      IF(I1.EQ.0)GO TO 1021
      IF(I1.EQ.1)GO TO 1022
1022  CONTINUE
      REWIND 2
      READ(2,1012)TW,WS,WT,EC,EL,ES,JAM,IRCS,IWARN,ICHAFF,IFS,
     *      IFV,XMD,XMA,XMM,DSR,SAMH,SAMD,AAH,AAD,
     *      PDAR,PDSM,PHAR,PHSM,AVAA,PKHAA,VASM,PKHSM,PSAR,
     *      PSSM,ACR,X1NPAS,ACR1,NSRT,XNPASS,NS,
     *      ACR2,TOTSR,TOTACK,TOTACL,TOTACR,BLTOGW,TOGW
1012  FORMAT(' ',5G12.4)
      GO TO 1
C******************************************************************
1021  CONTINUE
      DATA TW/1.0/,WS/105./,WT/4000./,EC/3.5/,EL/9.0/,ES/7.0/
      DATA JAM/0/,IRCS/0/,IWARN/0/,ICHAFF/0/
      DATA IFS/1/,IFV/1/
      DATA XMD/200./,XMA/40000./,XMM/1.8/,DSR/9.31/
      DATA SAMH/.0017/,SAMD/20./,AAH/.01/,AAD/4./
      DATA PDAR/.9900/,PDSM/.9947/
```

```
      DATA PHAR/.9989/,PHSM/.9103/
      DATA AVAA/600./,PKHAA/1./,VASM/600./,PKHSM/1./
      DATA PSAR/.0111/,PSSM/.0995/
C- #3 ------------------------------------------------------------
      DATA ACR/100./,XINPAS/1./
      DATA ACR1/100./,NSRT/20/,XNPASS/1./,NS/4/
      DATA ACR2/0.00/,TOTSR/154.57/,TOTACK/91.84/,TOTACL/100.00/
      DATA TOTACR/0.00/,BLTCGW/64071.66/,TOGW/64071.66/
C- #5 ------------------------------------------------------------
      DATA N/0/
C*****************************************************************
C     MAIN MENU DISPLAY
C*****************************************************************
100       CONTINUE
1         CONTINUE
        CALL FRTCMS('CLRSCRN ')
      WRITE(4,1001)
1001  FORMAT('1','STRIKE MENU (1) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION                ',T51,'HP'/
     +T6,'AIRCRAFT DESIGN SELECTION         ',T51,'DE'/
     +T6,'COMBAT SCENARIO SELECTION         ',T51,'MS'/
     +T6,'SUSCEPTIBILITY ASSESSMENT         ',T51,'SA'/
     +T6,'VULNERABILITY ASSESSMENT          ',T51,'VA'/
     +T6,'SURVIVABILITY ASSESSMENT          ',T51,'SV'/
     +T6,'TO TRANSFER TO OTHER MENUS        ',T51,'TN'/
     +T6,'TO EXIT OR PRINT RESULTS          ',T51,'EX'/)
      READ(5,2000) K1Q
2000  FORMAT(A4)
      IF(K1Q.EQ.K1(1)) GO TO 110
      IF(K1Q.EQ.K1(2)) GO TO 120
      IF(K1Q.EQ.K1(3)) GO TO 130
      IF(K1Q.EQ.K1(4)) GO TO 140
      IF(K1Q.EQ.K1(5)) GO TO 150
      IF(K1Q.EQ.KK(1)) GO TO 9971
      IF(K1Q.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------
      IF(K1Q.EQ.KK(3)) GO TO 1061
      WRITE(4,1200)
1200  FORMAT(' ','INPUT ERROR. REPEAT INPUT')
      GO TO 1
C*****************************************************************
C     MENU 2  DESIGN
C*****************************************************************
110     CALL FRTCMS('CLRSCRN ')
2         CONTINUE
      WRITE (4,1110)
1110  FORMAT('1','MENU (2) DESIGN, ENTER  A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION                ',T51,'HP'/
```

```
     +T6,'A/C PERFCRMANCE INCICATORS   ',T51,'AP'/
     +T6,'SUSCEPTIBILITY FEATURES      ',T51,'SF'/
     +T6,'VULNERABILITY FEATURES       ',T51,'VF'/
     +T6,'TC RETURN TC MENU (1)        ',T51,'RT'/
     +T6,'TC TRANSFER TO OTHER MENUS   ',T51,'TN'/)
      READ(5,2000) K2Q
      IF(K2Q.EQ.K2(1)) GC TC 210
      IF(K2Q.EQ.K2(2)) GC TC 220
      IF(K2C.EQ.K2(3)) GO TO 230
      IF(K2Q.EQ.KK(1)) GC TC 9972
      IF(K2C.EQ.KK(2)) GO TO 998
C- #3 -------------------------------------------------------------------
      IF(K2C.EC.KK(4)) GO TO 7
      WRITE(4,120C)
      GO TO 2
C***********************************************************************
C     MENU 3  COMBAT SCENARIC
C***********************************************************************
120       CALL FRTCMS('CLRSCRN ')
3          CCNTINUE
      WRITE (4,1120)
1120  FORMAT('1','MENU (3) COMBAT SCENARIC, ENTER A CODE AS FCLLOWS:'//
     +T6,'FOR AN EXPLANATION           ',T51,'HP'/
     +T6,'MISSION PROFILE              ',T51,'MP'/
     +T6,'THREAT SELECTION             ',T51,'TH'/
     +T6,'TO RETURN TC MENU (1)        ',T51,'RT'/
     +T6,'TC TRANSFER TO OTHER MENUS   ',T51,'TN'/)
      READ(5,2000) K3Q
      IF(K3C.EC.K3(1)) GO TO 310
      IF(K3Q.EQ.K3(2)) GO TO 320
      IF(K3C.EQ.KK(1)) GO TC 9973
      IF(K3Q.EQ.KK(2)) GO TO 998
C- #3 -------------------------------------------------------------------
      IF(K3C.EQ.KK(4)) GO TC 7
      WRITE(4,1200)
      GO TO 3
C***********************************************************************
C     MENU 4  SUCEPTIBILITY ASSESMENT
C***********************************************************************
130       CALL FRTCMS('CLRSCRN ')
4          CCNTINUE
      WRITE (4,1130)
1130  FORMAT('1','MENU (4) SUCEPTIBILITY ASSESSMENT,'//
     *T6,'ENTER A CODE AS FCLLOWS:'//
     +T6,'FCR AN EXPLANATION           ',T51,'HP'/
     +T6,'PROBABILITY CF DETECTION     ',T51,'PD'/
     +T6,'PRCBABILITY CF HIT           ',T51,'PH'/
     +T6,'TO RETURN TO MENU (1)        ',T51,'RT'/
```

```
     +T6,'TC TRANSFER TO OTHER MENUS  ',T51,'TN'/)
      READ(5,2000) K4Q
      IF(K4C.EC.K4(1)) GO TO 410
      IF(K4Q.EQ.K4(2)) GC TC 420
      IF(K4C.EC.KK(1)) GO TO 9974
      IF(K4C.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------------
      IF(K4C.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 4
C*********************************************************************
C     MENU 5  VULNERABILITY ASSESMENT
C*********************************************************************
140       CALL FRTCMS('CLRSCRN ')
5           CCNTINUE
      WRITE (4,1140)
1140  FORMAT('1','MENU (5) VULNERABILITY ASSESSMENT,'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION          ',T51,'HP'/
     +T6,'VULN AREA & P(K/H) VS A/A MISSILE  ',T51,'KH'/
     +T6,'VULN AREA & P(K/C) VS SAM   ',T51,'KD'/
     +T6,'TC RETURN TO MENU (1)       ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS  ',T51,'TN'/)
      READ(5,2000,ERR=1061) K5Q
      IF(K5C.EQ.K5(1)) GO TC 510
      IF(K5Q.EQ.K5(2)) GC TC 520
      IF(K5Q.EQ.KK(1)) GC TC 9975
      IF(K5C.EQ.KK(2)) GC TO 998
C- #3 ------------------------------------------------------------------
      IF(K5Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 5
C*********************************************************************
C     MENU 6  SURVIVABILITY ASSESMENT
C*********************************************************************
150       CALL FRTCMS('CLRSCRN ')
6           CCNTINUE
      WRITE (4,1150)
1150  FORMAT('1','MENU (6) SURVIVABILITY ASSESSMENT,'//
     *T6,'ENTER A CODE AS FCLLOWS:'//
     +T6,'FOR AN EXPLANATICN          ',T51,'HP'/
     +T6,'P(S) 1:1 A/A (RADAR MISSILE)',T51,'AR'/
     +T6,'P(S) 1:1 HIGH ALT SAM       ',T51,'HS'/
     +T6,'SINGLE SCRTIE               ',T51,'SS'/
     +T6,'CAMPAIGN EVALUATICN         ',T51,'CE'/
     +T6,'TC RETURN TC MENU (1)       ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS  ',T51,'TN'/)
      READ(5,2000,ERR=1061) K6Q
```

```
      IF(K6Q.EQ.K6(1)) GO TO 610
      IF(K6Q.EQ.K6(2)) GO TO 630
      IF(K6Q.EQ.K6(3)) GO TO 640
      IF(K6Q.EQ.K6(4)) GO TO 650
      IF(K6Q.EQ.KK(1)) GO TO 9978
      IF(K6Q.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------------
      IF(K6Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 6
C
C- #3 ------------------------------------------------------------------
C**********************************************************************
C**   MENU 7   REASSESSMENT                                          **
C**********************************************************************
    7 CONTINUE
      CALL SSRPDA(JAM,IRCS,PDAR)
      CALL SSRPDS(JAM,IRCS,DSR,PDSM)
      CALL SSRPHR(WS,XMM,XMA,IWARN,ICHAFF,DSR,PHAR)
      CALL SSRPHS(WS,XMM,XMA,IWARN,ICHAFF,DSR,PHSM)
      CALL SSRAVA(IFS,IFV,AVAA,PKHAA)
      CALL SSRAVS(IFS,IFV,JAM,IRCS,VASM,PKHSM)
C
C
      PSAR = 1. - PDAR * PHAR * PKHAA
      PSSM = 1. - PDSM * PHSM * PKHSM
C
      CALL CAMP(XMD,AAH,AAC,PKHAA,PSAR,0.,0.,0.,1.,1.,XMD,
     *          SAMH,SAMD,PKHSM,PSSM,ACR1,NSRT,XNPASS,NS,
     *          ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
C
      GO TO 1
C- #5 ------------------------------------------------------------------
C**********************************************************************
C**   MENU (8)    ROUTINE TO GENERATE P(K) VALUES FOR PLOTTING       **
C**********************************************************************
    8 CONTINUE
      IF(N.GE.3) GO TO 999
      CALL FRTCMS('CLRNSCRN ')
      WRITE(4,801)N
  801 FORMAT('1',' MENU(8) GRAPH CHOICES'//
     *       T6,'DO YOU WISH TO SAVE P(K) FOR THIS DESIGN?'/
     *       T6,'NOTE:  YOU HAVE ALREADY CHOSEN ',I1,' OF THE',
     *         ' 3 POSSIBLE DESIGNS'/T6,'FOR THIS PLOT.'//
     *       T6,'ENTER A CODE AS FOLLOWS:'/
     *       T6,'   TO SAVE P(K)',T51,'Y'/
     *       T6,'   DO NOT SAVE',T51,'N'/
     *       T6,'   FOR FURTHER EXPLANATION',T51,'HP')
```

```
C
      READ(4,2000)K8Q
         IF(K8Q.EC.JJ(1)) GC TO 81
         IF(K8Q.EC.JJ(2)) GC TO 999
         IF(K8Q.EC.KK(1)) GC TO 8888
C
      WRITE(4,1200)
      GO TO 8
   81 CONTINUE
         N = N + 1
         PKAR(N) = 1. - PSAR
         PKSM(N) = 1. - PSSM
C
      IF(N.NE.3) GO TO 999
C
      WRITE(8,802)(PKAR(I),PKSM(I),I=1,3)
  802 FORMAT(F4.2)
      GO TO 999
C
C*********************************************************************
C     MENU 21  A/C PERFORMANCE INPUTS
C*********************************************************************
210      CALL FRTCMS('CLRSCRN ')
21        CCNTINUE
      WRITE (4,1210)TW,WS,WT,ES,EC,EL
1210  FORMAT('1','       MENU (21) ENTER  A CODE AS FOLLOWS:'//
     +T6,'        A/C PERFORMANCE INDICATORS  '/
     +T6,'1   THRUST TO WEIGHT             ',T51,F6.4/
     +T6,'2   WING LOADING                 ',T51,F6.2,' PSF'/
     +T6,'3   ORDNANCE WEIGHT              ',T51,F6.0,' LBS'/
     +T6,'    ENGINE SEPERATION            ',T51,F6.2,' FT'/
     +T6,'    ENGINE DIAMETER              ',T51,F6.2,' FT'/
     +T6,'    ENGINE LENGTH                ',T51,F6.2,' FT'//
     +T6,'VALUES 1,2 & 3 ARE VARIABLE; TC CHANGE THEM ENTER ITS NUMBER I
     +N'/T6,'I1 FCRMAT. ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
1211  FORMAT(I1)
      IF(I1.EQ.0) GO TC 110
      GO TO (211,212,213),I1
1212  WRITE(4,1200)
      GO TO 210
211       CCNTINUE
          WRITE(4,1201)
1201      FORMAT('C','       TW RANGE ALLCWED IS .4 TO 1.2'/
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
1202      FORMAT(F9.4)
          TW=V1
```

```
      GC TO 210
212   CCNTINUE
      WRITE(4,1203)
1203  FCRMAT('0','       WS RANGE ALLCWED IS 90. TO 120.'/
   +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
      READ(5,1202)V1
      WS=V1
      GO TO 210
213   CONTINUE
      WRITE(4,1204)
1204  FCRMAT('0','       WT RANGE ALLCWED IS 1000. TO 14000.'/
   +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
      READ(5,1202)V1
      WT=V1
      GC TO 21C
C*******************************************************************
C     MENU 22  SUSCEPTIBILITY FEATURES
C*******************************************************************
220      CALL FRTCMS('CLRSCRN ')
22        CCNTINUE
     WRITE (4,1220)JAM,IRCS,IWARN,ICHAFF
1220 FORMAT('1','      MENU (22) ENTER  A CODE AS FOLLOWS:'//
   +T6,'  SUSCEPTIBILITY REDUCTION FEATURES      '/
   +T6,'1   JAMMER NUMBER               ',T51,I1/
   +T6,'2   RCS REDUCTION LEVEL         ',T51,I1/
   +T6,'3   RADAR WARNING RECEIVER      ',T51,I1/
   +T6,'4   CHAFF DISPENSER             ',T51,I1//
   +T6,'"0" INDICATES NOT INSTALLED "1" INDICATES INSTALLED'//
   +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT'/
   +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
     READ(5,1211)I1
     IF(I1.EQ.0) GO TC 110
     GO TO (221,222,223,224),I1
1229 WRITE(4,1200)
     GO TC 220
221       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1221)
1221 FORMAT('1','          JAMMERS AVAILABLE          '//
   +T6,'0                        00   ',/
   +T6,'1                        50 WATTS',/
   +T6,'2                       100 WATTS',/
   +T6,'3                       200 WATTS',/
   +T6,'4                       500 WATTS',/
   +T6,'5                      1000 WATTS',//
   +T6,'ENTER THE JAMMER NUMBER IN I1 FCRMAT')
      READ(5,1211)I1
      JAM=I1
```

```
      GO TO 220
222   CONTINUE
     CALL FRTCMS('CLRSCRN ')
      WRITE(4,1222)
1222  FORMAT('0','          RCS REDUCTION LEVELS               '//
     +T6,'0                  NO REDUCTION  ',/
     +T6,'1                  PROCEDURE 1',/
     +T6,'2                  PROCEDURE 2',/
     +T6,'3                  PROCEDURE 1 & 2',/
     +T6,'4                  PROCEDURE 1 & 3',/
     +T6,'5                  PROCEDURE 1,3 & 5',/
     +T6,'6                  PROCEDURE 1,3,5,& 8',/
     +T6,'7                  PROCEDURE 1,3,5,6,7, & 8',/
     +T6,'8                  PROCEDURE 1,4,5,6,7, & 8',//
     +T6,'ENTER THE DESIRED RCS LEVEL IN I1 FORMAT')
      READ(5,1211)I1
      IRCS=I1
      GO TO 220
223   CONTINUE
      WRITE(4,1223)
1223  FORMAT(' ','          RADAR WARNING RECEIVER             '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      IWARN=I1
      GO TO 220
224   CONTINUE
      WRITE(4,1224)
1224  FORMAT(' ','          CHAFF DISPENSER                    '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      ICHAFF=I1
      GO TO 220
C*********************************************************************
C     MENU 23  VULNERABILITY FEATURES
C*********************************************************************
230  CALL FRTCMS('CLRSCRN ')
23    CONTINUE
     WRITE (4,1230)IFS,IFV
1230 FORMAT('1','        MENU (23) ENTER  A CODE AS FOLLOWS:'//
     +T6,'   VULNERABILITY REDUCTION FEATURES  '//
     +T6,'1   FUEL SYSTEM GENERAL        ',T51,I1/
     +T6,'2   FUEL/VOID INTERFACE        ',T51,I1//
     +T6,'"1" MINIMUM PROTECTION '/
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT'//
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
     READ(5,1211)I1
```

```
      IF(I1.EQ.0) GO TO 110
      GO TO (231,232),I1
1239  WRITE(4,1200)
      GO TO 230
231      CCNTINUE
        CALL FRTCMS('CLRSCRN ')
         WRITE(4,1231)
1231  FORMAT('1','             FUEL SYSTEM, GENERAL        '//
     +T6,'1     SINGLE SUMP TANK, NO SELF-SEALING     ',/
     +T6,'2     DUAL SUMP TANKS,  NO SELF-SEALING     ',/
     +T6,'3     SINGLE SUMP TANK, WITH SELF-SEALING ',/
     +T6,'4     DUAL SUMP TANKS,  WITH SELF-SEALING ',//
     +T6,'ENTER THE PROTECTION NUMBER IN I1 FORMAT')
         READ(5,1211)I1
         IFS=I1
         GC TO 230
232      CCNTINUE
        CALL FRTCMS('CLRSCRN ')
         WRITE(4,1232)
1232  FORMAT('1','             FUEL/VOID INTERFACE         '//
     +T6,'1     TANKS ACJACENT TO DRY BAYS, HIGH SURFACE TEMP',/
     +T6,'2     INTERNAL FUEL TANK FOAM                       ',/
     +T6,'3     ULLAGE INERTING                               ',/
     +T6,'4     VOIC SPACE FCAM                               ',/
     +T6,'5     VOIC SPACE FIRE EXTINGUISHING                 ',/
     +T6,'6     BOTH INTERNAL AND VOIC PRCTECTION 2 OR 3 & 4 OR 5',//
     +T6,'ENTER THE DESIRED PROTECTICN LEVEL IN I1 FORMAT')
         READ(5,1211)I1
         IFV=I1
         GC TO 230
C*************************************************************************
C     MENU 31  MISSION DESCRIPTION
C*************************************************************************
310     CALL FRTCMS('CLRSCRN ')
31       CCNTINUE
      WRITE (4,1310)XMD,XMA,XMM
1310  FORMAT('1','         MENU (31)                        '//
     +T6,'       MISSION DESCRIPTION           '//
     +T6,'1   MISSION PENETRATION DISTANCE ',T51,F6.0,' MI'/
     +T6,'2   MISSION PENETRATION ALTITUCE ',T51,F6.0,' FT'/
     +T6,'3   MISSION PENETRATION MACH     ',T51,F6.4//
     +T6,'TO CHANGE THEM ENTER ITS NUMBER IN I1 FORMAT.'//
     +T6,' ENTER C FOR NO CHANGE REQUIREC')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TC 120
      GO TO (311,312,313),I1
1319  WRITE(4,1200)
      GO TO 310
```

```
311        CONTINUE
           WRITE(4,1311)
1311      FORMAT('0','     PENETRATION DISTANCE RANGE 100. TO 1000. NM'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XMC=V1
           GO TO 310
312        CONTINUE
           WRITE(4,1312)
1312   FORMAT('0','     PENETRATION ALTITUDE RANGE 40000 TO 60000. FT'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XMA=V1
           DSR = XMA/4296.4
           GC TO 310
313        CONTINUE
           WRITE(4,1313)
1313       FORMAT('0','       PENETRATICN MACH RANGE 1.4 TO 2.2 MACH'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XMM=V1
           GC TO 310
C*****************************************************************
C      MENU 32  THREAT DEFINITION
C*****************************************************************
320       CALL FRTCMS('CLRSCRN ')
32         CCNTINUE
       WRITE (4,132C)AAH,AAD,SAMH,SAMC
1320   FORMAT('1','       MENU (32)                        '//
     +T6,'      THREAT DEFINITION               '//
     +T6,'1   A/A THREAT DENSITY        ',T51,F6.4,' WP/SQ.MI.'/
     +T6,'2   A/A THREAT DIAMETER       ',T51,F6.2,' MI.'//
     +T6,'3   SAM THREAT DENSITY        ',T51,F6.4,' WP/SQ.MI.'/
     +T6,'4   SAM THREAT DIAMETER       ',T51,F6.2,' MI'//
     +T6,'TO CHANGE THEM ENTER ITS NUMBER IN I1 FORMAT.'//
     +T6,' ENTER C FOR NO CHANGE REQUIREC')
       READ(5,1211)I1
       IF(I1.EQ.0) GO TC 120
       GO TO (321,322,323,324),I1
1329   WRITE(4,1200)
       GO TO 320
321        CCNTINUE
           WRITE(4,1321)
1321       FCRMAT('0','       A/A THREAT DENSITY RANGE 0.0 TO .02    '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           AAH=V1
           GO TO 32C
```

```
322       CCNTINUE
          WRITE(4,1322)
1322      FCRMAT('0','        A/A THREAT DIAMETER RANGE 0.0 TO 5.   '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          AAD=V1
          GC TO 320
323       CCNTINUE
          WRITE(4,1323)
1323      FORMAT('0','        SAM THREAT DENSITY RANGE 0.0 TO .002   '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          SAMH=V1
          GO TO 32C
324       CONTINUE
          WRITE(4,1324)
1324      FORMAT('0','        SAM THREAT DIAMETER RANGE 0.0 TO 25.   '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          SAMD=V1
          GC TC 320
C*****************************************************************
C     MENU 41  PRCB OF DETECTION
C*****************************************************************
410      CALL FRTCMS('CLRSCRN ')
41        CCNTINUE
      WRITE(4,1410)
1410  FORMAT('1','MENU (41) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION             ',T51,'HP'/
     +T6,'P(D) VS A/A (RADAR MISSILE) ',T51,'AR'/
     +T6,'P(C) VS HIGH ALT. SAM          ',T51,'HS'/
     +T6,'TC RETURN TC MENU (4)          ',T51,'RT'/
     +T6,'TC TRANSFER TO OTHER MENUS   ',T51,'TN'/)
      READ(5,2000) K7Q
      IF(K7Q.EQ.K6(1)) GO TC 411
      IF(K7Q.EQ.K6(2)) GO TC 413
      IF(K7Q.EQ.KK(1)) GO TC 9976
      IF(K7C.EQ.KK(2)) GO TC 998
      IF(K7Q.EQ.KK(4)) GC TC 130
      WRITE(4,1200)
      GO TO 41
C*****************************************************************
C     PD A/A RADAR MISSILE
C*****************************************************************
411      CALL FRTCMS('CLRSCRN ')
         CALL SSRPDA(JAM,IRCS,PDAR)
4119  WRITE (4,1411)PDAR
1411  FORMAT('1',T6,'THE COMPUTED PROBABILITY OF DETECTION BY A/A (RADAR
```

```
     +) MISSILE IS ',F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIREC')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TC 410
      IF(I1.EQ.1) GO TC 1413
1419  WRITE(4,120C)
      GO TO 411
1413      CCNTINUE
          WRITE(4,1417)
1417      FCRMAT('0','        PD  RANGE   C.0 TC 1.C     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          PDAR=V1
          GC TO 4119
C***********************************************************************
C     PD VS SAM
C***********************************************************************
413       CCNTINUE
      CALL SSRPDS(JAM,IRCS,CSR,PDSM)
         CALL FRTCMS('CLRSCRN ')
1490  WRITE (4,1491)PDSM
1491  FORMAT('1',T6,'THE COMPUTED PRCB OF DETECTION BY THE HIGH ALT SAM
     +IS ',1X,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER C FCR NC CHANGE REQUIREC')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TC 410
      IF(I1.EQ.1) GO TC 1492
1493  WRITE(4,120C)
      GO TO 1490
1492      CCNTINUE
          WRITE(4,1417)
          READ(5,1202)V1
          PDSM=V1
          GC TO 1490
C***********************************************************************
C     MENU 42  PRCB OF HIT
C***********************************************************************
420      CALL FRTCMS('CLRSCRN ')
42        CCNTINUE
      WRITE(4,1420)
1420  FORMAT('1','MENU (42) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T51,'HP'/
     +T6,'P(H) VS A/A (RADAR MISSILE) ',T51,'AR'/
     +T6,'P(H) VS HIGH ALT. SAM          ',T51,'HS'/
     +T6,'TO RETURN TO MENU (4)          ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS    ',T51,'TN'/)
      READ(5,20C0) K80
      IF(K80.EQ.K6(1)) GC TC 421
```

```
      IF(K8C.EQ.K6(2)) GC TC 423
      IF(K8Q.EQ.KK(1)) GC TC 9977
      IF(K8C.EQ.KK(2)) GO TO 998
      IF(K8C.EQ.KK(4)) GC TO 130
      WRITE(4,1200)
      GO TO 42
C*********************************************************************
C     PROB OF HIT A/A RACAR MISSILE
C*********************************************************************
421    CONTINUE
      CALL SSRPHR(WS,XMM,XMA,IWARN,ICHAFF,DSR,PHAR)
1421     CALL FRTCMS('CLRSCRN ')
         WRITE (4,14911)PHAR
14911  FORMAT('1',T6,'THE CCMPUTED PROB CF HIT BY A/A MISSILE) IS '
     +,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER C FCR NO CHANGE REQUIREC')
       READ(5,1211)I1
       IF(I1.EQ.0) GO TO 420
       IF(I1.EQ.1) GO TO 14212
14913  WRITE(4,12CC)
       GO TC 1421
14212     CCNTINUE
          WRITE(4,1497)
1497      FORMAT('0','        PH  RANGE   0.0 TC 1.0     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          PHAR=V1
          GC TO 1421
C*********************************************************************
C     PROB OF HIT HIGH ALT SAM
C*********************************************************************
423    CONTINUE
      CALL SSRPHS(WS,XMM,XMA,IWARN,ICHAFF,DSR,PHSM)
1423     CALL FRTCMS('CLRSCRN ')
         WRITE (4,14923)PHSM
14923  FORMAT('1',T6,'THE CCMPUTED PROB CF HIT BY HIGH ALT SAM IS '
     +,F6.4 //T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIREC')
       READ(5,1211)I1
       IF(I1.EQ.0) GO TO 420
       IF(I1.EQ.1) GO TO 14232
14933  WRITE(4,1200)
       GO TO 1423
14232     CCNTINUE
          WRITE(4,1497)
          READ(5,1202)V1
          PHSM=V1
          GC TO 1423
```

```
C*****************************************************************
C MENU 51  VULN. AREA / P(K/H) VS A/A RADAR MISSILE
C*****************************************************************
510     CONTINUE
         CALL SSRAVA(IFS,IFV,AVAA,PKHAA)
1511      CALL FRTCMS('CLRSCRN ')
          WRITE (4,1512)AVAA,PKHAA
1512    FORMAT('1',T6,' THE COMPUTED VULN AREA VS A/A MISSILE IS '
     +,T51,F6.0,/T6,'THE P(K/H) IS ',T51,F6.4,//
     +T6,'TO CHANGE THESE VALUES ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 140
        IF(I1.EQ.1) GO TO 1513
1514    WRITE(4,1200)
        GO TO 1511
1513        CONTINUE
            WRITE(4,1515)
1515        FORMAT('0','         VULN. AREA   RANGE   00.0 TO 600.0    '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            AVAA=V1
            PKHAA = AVAA/600.
            GO TO 1511
C*****************************************************************
C       VULN. AREA / P(K/H) VS HIGH ALT SAM
C*****************************************************************
520         CONTINUE
       CALL SSRAVS(IFS,IFV,JAM,IRCS,VASM,FKHSM)
1521      CALL FRTCMS('CLRSCRN ')
          WRITE (4,1522)VASM,PKHSM
1522    FORMAT('1',T6,' THE COMPUTED VULN AREA VS SAM IS ',T51,F6.0/T6,
     +'THE P(K/H) IS ',T51,F6.4,//T6,'TO CHANGE THESE VALUES ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 140
        IF(I1.EQ.1) GO TO 1523
1524    WRITE(4,1200)
        GO TO 1521
1523        CONTINUE
            WRITE(4,1525)
1525        FORMAT('0','         VULN. AREA   RANGE   00.0 TO 600.0    '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            VASM=V1
            PKHSM = VASM / 600.
            GO TO 1521
C*****************************************************************
```

```
C MENU 61   P(S) A/A RADAR MISSILE
C*****************************************************************
610       PSAR = 1.- PDAR * PHAR * PKHAA
618       CALL FRTCMS('CLRSCRN ')
      WRITE (4,2220)JAM,IFS,IRCS,IFV,IWARN,ICHAFF
2220  FORMAT('0','* SUSCEPTIBILITY REDUCTION FEATURES ',
     +T40,' * VULNERABILITY  REDUCTION FEATURES   '//
     +,'      JAMMER NUMBER               ',T35,I1,
     +T42,'    FUEL SYSTEM GENERAL         ',T69,I1/
     +,'      RCS REDUCTION LEVEL         ',T35,I1,
     +T42,'    FUEL/VOID INTERFACE         ',T69,I1/
     +,'      RADAR WARNING RECEIVER      ',T35,I1/
     +,'      CHAFF DISPENSER             ',T35,I1/)
         WRITE(4,1610)PSAR,PDAR,PHAR,PKHAA
1610     FORMAT('0',T6,' THE PROB OF SURVIVAL VS AA(RADAR)'//
     +T6,'    PS    =  1   -    PD    *    PH    *    PK/H '/
     +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
     +T6,'TO CHANGE THIS VALUE ENTER 1 IN I1 FORMAT'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
      IF(I1.EQ.0) GO TO 150
      GO TO (611,1619),I1
1619  WRITE(4,1200)
          GO TO 618
611       CONTINUE
          WRITE(4,1611)
1611  FORMAT('0',T6,'ENTER P(D),P(H), P(K/H) IN REAL NUMBER FORMAT'/
     +T6,'                        (RANGE 0.001 TO 1.00)')
          READ(5,1657)PDAR,PHAR,PKHAA
          PSAR=1. - PDAR * PHAR * PKHAA
          GO TO 618
C*****************************************************************
C     P(S) HIGH ALT SAM
C*****************************************************************
630       PSSM = 1.- PDSM * PHSM * PKHSM
638       CALL FRTCMS('CLRSCRN ')
      WRITE (4,2220)JAM,IFS,IRCS,IFV,IWARN,ICHAFF
         WRITE(4,1630)PSSM,PDSM,PHSM,PKHSM
1630     FORMAT('0',T6,' THE PROB OF SURVIVAL VS SAM'//
     +T6,'    PS    =  1   -    PD    *    PH    *    PK/H '/
     +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
     +T6,'TO CHANGE THIS NUMBER ENTER 1 IN I1 FORMAT.'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
      IF(I1.EQ.0) GO TO 150
      GO TO (631,1639),I1
1639  WRITE(4,1200)
          GO TO 638
```

```
631       CONTINUE
          WRITE(4,1611)
          READ(5,1657)PDSM,PHSM,PKHSM
          PSSM= 1. - PDSM * PHSM * PKHSM
          GO TO 638
C*****************************************************************************
C MENU 62      SORTIE ANALYSIS
C*****************************************************************************
640      CONTINUE
649      CALL FRTCMS('CLRSCRN ')
      WRITE (4,1640)ACR,X1NPAS,PSAR,PSSM
1640  FORMAT('1',' MENU (62)  SORTIE ANALYSIS'//
     +T6,'1   AIRCRAFT IN SORTIE                ',T46,F6.0/
     +T6,'2   NUMBER OF PASSES PER SORTIE  ',T44,F6.0/
     +T6,'3   P(S) VS A/A RADAR MISSILE      ',T48,F6.4/
     +T6,'4   P(S) VS HIGH ALT SAM             ',T48,F6.4//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
      IF(I1.EQ.0) GO TO 689
      GO TO (641,642,618,638),I1
1648  WRITE(4,1200)
          GO TO 640
641       CONTINUE
          WRITE(4,1651)
          READ(5,1657)V1
          ACR=V1
          GO TO 649
642       CONTINUE
          WRITE(4,1653)
          READ(5,1202)V1
          X1NPAS=V1
          GO TO 649
689    CALL  SORT(
     &XMD,AAH,AAD,PKHAA,PSAR,0.,0.,0.,1.,1.,XMD,SAMH,SAMD,PKHSM,PSSM,
     &ACR,NSRT,X1NFAS,NS, ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
         CALL FRTCMS('CLRSCRN ')
      WRITE (4,1689)ACR2,TOTSR,TOTACK,TOTACL,TOTACR
1689  FORMAT('1','       RESULTS FROM SINGLE SORTIE AGAINST THE THREATS'//
     +T6,'     UNDAMAGED AIRCRAFT          ',T51,F6.2/
     +T6,'     SORTIES FLOWN              ',T51,F6.2/
     +T6,'     TARGETS ATTACKED           ',T51,F6.2/
     +T6,'     AIRCRAFT LOST              ',T51,F6.2/
     +T6,'     AIRCRAFT DAMAGED           ',T51,F6.2//
     +T6,'TO RERUN A SORTIE ANALYSIS ENTER "1" '/
     +T6,'TO RETURN TO MENU (6) ENTER 0')
      READ(5,1211)I1
       IF(I1.EQ.1) GO TO 640
```

```
      GO TO 150
C*****************************************************************
C MENU 63     CAMPAIGN ANALYSIS
C*****************************************************************
650     CONTINUE
659      CCNTINUE
        CALL FRTCMS('CLRSCRN ')
      WRITE (4,1650)ACR1,NSRT,XNPASS,NS,PSAR,PSSM
1650  FORMAT('1',' MENU (63)  CAMPAIGN ANALYSIS '//
     +T6,'1    AIRCRAFT IN CAMPAIGN              ',T46,F6.0/
     +T6,'2    NUMBER OF RAIDS IN CAMPAIGN',T43,I6/
     +T6,'3    NUMBER OF PASSES PER SCRTIE   ',T44,F6.0/
     +T6,'4    NUMBER OF SORTIES FOR REPAIR  ',T43,I6//
     +T6,'5    P(S) VS A/A MISSILE             ',T48,F6.4/
     +T6,'6    P(S) VS HIGH ALT SAM            ',T48,F6.4//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
1659  FORMAT(I1)
      IF(I1.FQ.0) GO TO 699
      GO TO (651,652,653,656,618,638),I1
1658  WRITE(4,1200)
         GC TO 650
651      CCNTINUE
         WRITE(4,1651)
1651     FCRMAT('0',T6,'ENTER NUMBER OF A/C IN REAL NUMBER FORMAT.')
         READ(5,1657)V1
1657     FORMAT(F8.4)
         ACR1=V1
         GO TO 659
652      CCNTINUE
         WRITE(4,1652)
1652     FCRMAT('0',T6,'ENTER NUMBER OF RAIDS IN I2 FORMAT.')
         READ(5,1697)I2
1697     FCRMAT(I2)
         NSRT=I2
         GC TO 659
653      CCNTINUE
         WRITF(4,1653)
1653   FORMAT('0',T6,'ENTER PASSES PER SCRTIE IN REAL NUMBER FORMAT.')
         READ(5,1202)V1
         XNPASS=V1
         GC TO 659
656      CCNTINUE
         WRITE(4,1656)
1656     FORMAT('0',T6,'ENTER MAX NUMBER OF SORTIES FOR REPAIR IN I2 FO
     +RMAT.')
         READ(5,1697)I2
```

```
      NS=I2
      GC TO 659
699   CALL FRTCMS('CLRSCRN ')
      CALL  CAMP(
     &XMD,AAH,AAD,PKHAA,PSAR,0.,0.,0.,1.,1.,XMD,SAMH,SAMD,PKHSM,PSSM,
     &ACR1,NSRT,XNPASS,NS, ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
      WRITE (4,1699)ACR2,TOTSR,TOTACK,TOTACL,TOTACR
1699  FORMAT('1','      RESULTS FROM SINGLE SORTIE AGAINST THE THREATS'//
     +T6,'    A/C READY FOR NEXT LAUNCH',T51,F6.0/
     +T6,'    SORTIES FLCWN            ',T51,F8.0/
     +T6,'    TARGETS ATTACKED         ',T51,F8.0/
     +T6,'    AIRCRAFT LCST            ',T51,F6.0/
     +T6,'    AIRCRAFT IN REPAIR       ',T51,F6.0//
     +T6,'TC RERUN A CAMPAIGN ENTER 1 '/
     +T6,'TO RETURN TC MENU (6) ENTER 0')
      READ(5,1211)I1
      IF(I1.EQ.1) GO TO 65C
      GO TC 150
C*****************************************************************
C     HELP
C*****************************************************************
9971  CALL FRTCMS('CLRSCRN ')
      WRITE(4,7971)
7971  FORMAT(' ','                HELP FCR MENU 1              '/
     +T6,' THE VISAP DESIGN EVALUATOR IS CIVICED INTO FIVE SECTIONS. '/
     +T6,'      THE AIRCRAFT CESIGN SECTICN IS WHERE A DESCRIPTION OF'/
     +T6,' THE AIRCRAFT IS ENTERED. THIS INCLUDES GENERAL PARAMETRIC'/
     +T6,' SIZING VALUES AS WELL AS CESCRIPTICNS OF THE S/V FEATURES'/
     +T6,' CONTAINED IN THE CESIGN. VALUES SHOWN INITIALLY ARE DEFAULT'/
     +T6,' VALUES WHICH MAY BE CHANGED.'/
     +T6,'      THE MISSICN SECTION IS WHERE THE MISSION PARAMETERS AND'/
     +T6,' THREAT INTENSITY VALUES ARE ENTERED. NOTE THAT THE TYPE'/
     +T6,' CF THREATS CANNCT BE CHANGED BECAUSE THE SELECTION OF THE'/
     +T6,' AIRCRAFT DETERMINES THE THREATS.                '/
     +T6,'      THE LAST THREE SECTICNS ARE FOR EVALUATION OF THE'/
     +T6,' CESIGN. IF THE DESIGN AND THREAT SECTIONS ARE NOT ENTERED'/
     +T6,' DEFAULT VALUES (BASELINE) WILL BE USED FOR ALL CALCULATIONS.'
     +,//T6,'         ENTER ANY INTEGER TO RETURN TO MENU 1      ')
      READ(5,*)IJK
      GO TO 100
9972  CALL FRTCMS('CLRSCRN ')
      WRITE(4,7972)
7972  FORMAT(' ','                HELP FCR MENU 2              '/
     +T6,' THE DESIGN SECTION IS DIVIDED INTO THREE SUBSECTIONS.'/
     +T6,'      THE AIRCRAFT PERFORMANCE INDICATORS AFFECT THE '/
     +T6,' ABILITY OF THE AIRCRAFT TC MANEUVER ANC AVOID THE THEAT.'/
     +T6,' SCME OF THE VALUES MAY REMOVE THE AIRCRAFT FROM THE'/
     +T6,' THREAT ENVELOPE CCMPLETELY. A FURTHER CISCUSSION OF THE '/
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     +T6,' IMPACT OF THESE VALUES MAY BE FOUND IN THE P(H) SECTION'/
     +T6,' OF SUSCEPTIBILITY EVALUATION.        '/
     +T6,'     SUSCEPTIBILITY REDUCTION FEATURES OF THE DESIGN ARE'/
     +T6,' ENTERED IN THIS SECTION. THESE INCLUDE JAMMER SIZE, RCS '/
     +T6,' REDUCTION LEVELS, CHAFF DISPENSER AND RADAR WARNING RE- '/
     +T6,' CEIVER. THE DEFAULT VALUES (BASELINE) ARE ZERO, INDICATING'/
     +T6,' NONE OF THESE FEATURES ARE INCLUDED.                     '/
     +T6,'     VULNERABILITY REDUCTION FEATURES VARY WITH THE THREE'/
     +T6,' TYPES OF AIRCRAFT. SELECT THOSE FEATURES THAT BEST'/
     +T6,' DESCRIBE YOUR DESIGN. MINIMUM VALUES OF 1 (BASELINE)'/
     +T6,' INDICATE NO IMPROVEMENTS.                                '//
     +T6,'         ENTER ANY INTEGER TO RETURN TO MENU 2            ')
      READ(5,*)IJK
      GO TO 110
9973     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7973)
7973  FORMAT(' ',‘                  HELP FOR MENU 3               '/
     +T6,' THE COMBAT SCENERIO SECTION IS DIVIDED INTO TWO SUBSECTIONS.
     +'/,T6,'     IN MISSION PROFILE, VALUES ARE ENTERED TO SPECIFICALLY
     +'/,T6,' DEFINE THE DESIRED MISSION.THE MISSION PARAMETERS ARE DEFI
     +NED'/,T6,' BY THE SELECTION OF AIRCRAFT TYPE. THESE INCLUDE ITEMS'
     +/,T6,' THAT MIGHT BE CONSIDED AS TACTICS.                  '/
     +T6,'     IN THREAT SELECTION, THREAT DENSITIES AND THREAT'/
     +T6,' DIAMETERS ARE ENTERED.  THE THREATS FOR THE LONG RANGE STRIKE
C- #2 -----------------------------------------------------------------
     +'/,T6,' MISSION ARE; AIR-TO-AIR IR MISSILES AND HIGH ALTITUDE SAM'
     +'S'/,T6,'        ENTER ANY INTEGER TO RETURN TO MENU 3           ')
      READ(5,*)IJK
      GO TO 120
9974     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7974)
7974  FORMAT(' ',‘                  HELP FOR MENU 4               '/
     +T6,' THE SUSCEPTIBILITY ASSESSMENT SECTION HAS TWO SUBSECTIONS.'/
     +T6,'     THE PROBABILITY OF DETECTION IS AFFECTED BY THE'/
     +T6,' RCS OF THE AIRCRAFT, THE POWER OF THE NOISE JAMMER, '/
     +T6,' AND THE SLANT RANGE FROM THE THREAT TO THE A/C AT CPA.'/
     +T6,' NOTE THAT ALL AIRCRAFT ARE CONSIDERED TO PASS OVER A POINT'/
     +T6,' THAT IS THE SAME HORIZONTAL DISTANCE FROM THE THREAT '/
     +T6,' AS THE ALTITUDE OF THE AIRCRAFT. THIS MEANS THAT THE'/
     +T6,' CPA SLANT RANGE IS 1.414 TIMES THE ALTITUDE.'/
     +T6,'     THE PROBABILITY OF HIT IS DEFINED SEPARATELY FOR EACH'/
     +T6,' AIRCRAFT AND THREAT. HOWEVER, THE FORM IS CONSISTENT, WHERE'/
     +T6,' P(H) REFERS TO THE PROBABILITY THAT A NON-MANEUVERING A/C'/
     +T6,' WOULD BE HIT BY THE THREAT, F(M) IS THE MANEUVER FACTOR.'/
     +T6,' AND F(C) IS THE COUNTERMEASURE (CHAFF OR FLARE) FACTOR.'//
     +T6,'           P(H)'' = P(H) * F(M) * F(C)                    '//
     +T6,'         ENTER ANY INTEGER TO RETURN TO MENU 4            ')
      READ(5,*)IJK
```

```
      GO TO 130
9975     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7975)
7975  FORMAT(' ','                           HELP FOR MENU 5          '/
     +T6,'        THE VULNERABILITY ASSESSMENT SECTION CALCULATES  '/
     +T6,' EITHER THE P(K/H) OR THE AVERAGE VULNERABLE AREA FOR THE '/
     +T6,' AIRCRAFT VERSUS A THREAT. FOR THE STRIKE AIRCRAFT;    '//
     +T6,'    VS AAA                                              '/
     +T6,'        P(K/H) = FRCM TABLE BASED UPON VULN. FEATURES   '/
     +T6,'        AP = 600.                                    '/
     +T6,'        AV = AF * P(K/H)                                 '/
     +T6,'    VS SAM                                               '/
     +T6,'        P(K/H) = FRCM TABLE BASEC UPON CEP             '/
     +T6,'              ** NOTE ** CEP FUNCTION OF RCS & JAMMER     '/
     +T6,'        AP = ASSUMEC 600.                                 '/
     +T6,'        AV  = AP * F(K/H)                             '//
     +T6,'           ENTER ANY INTEGER TO RETURN TO MENU 5         ')
      READ(5,*)IJK
      GO TO 140
9976     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7976)
7976  FORMAT(' ','                           HELP FOR MENU 41         '/
     +T6,'        THE FOLLCWING METHODS ARE USED FOR THE STRIKE P(D)'//
     +T6,'    VS AAA                                                '/
     +T6,'        P(D) = FUNCTION OF SLANT RANGE AT CPA          '/
     +T6,'    VS SAM                                                '/
     +T6,'        P(C) = TWO TIMES THE INTEGRAL OF THE GAUSSIAN      '/
     +T6,'              PROBABILITY FUNCTION FROM INFINITY TO CPA'//
     +T6,'           ENTER ANY INTEGER TO RETURN TO MENU 41         ')
      READ(5,*)IJK
      GO TO 410
9977     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7977)
7977  FORMAT(' ','                           HELP FOR MENU 42         '/
     +T6,'        THE FOLLOWING METHODS ARE USEC FOR THE STRIKE P(H)'/
     +T6,'PH = PRCBABILITY THAT A NON-MANEUVERING A/C IS HIT        '/
     +T6,'FA = PRCBABILITY THAT THE CREW IS ALLERTED AND TAKE EVASIVE AC
     +TION.'/
     +T6,'FM = MANEUVER FACTOR          FC = CHAFF FACTOR'/
     +T6,'WS = WING LOADING/100.        TW = THRUST TO WEIGH'/
     +T6,'ALT = PENETRATION ALT / 10,000                  H'//
     +T6,'    VS AAA GUNS                                           '/
     +T6,'         PH= 1.0                     FA= 1.'/
     +T6,'         FM= 1+ .961 * WS**2 - .C8246 * MACH * ALT'/
     +T6,'         PH'' = PH * FC * (1. -(1.-FM)*FA)                 '/
     +T6,'    VS SAM                                                '/
     +T6,'         PH = .95595       FC = .6                        '/
     +T6,'         FM = 1.-.35393 * MACH**2 + .169654 * WS * ALT     '/
```

```
     +T6,'        PH'' = PH * FC * ( 1. - (1.- FM) * FA)              '//
     +T6,'          ENTER ANY INTEGER TO RETURN TO MENU 42             ')
      READ(5,*)IJK
      GO TO 420
9978     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7978)
7978  FORMAT(' ','                       HELP FOR MENU 6        '//
     +T6,'THE P(S) VS INDIVIDUAL WEAPONS                          '/
     +T6,'    P(S) = 1 -  P(D) * P(H) * P(K/H)                     '//
     +T6,'THE P(S) FOR SINGLE SORTIE                          '/
     +T6,'    W = WEIGHTING FACTOR           XL = PENETRATION DISTANCE'/
     +T6,'    XH = THREAT DENSITY             DL = THREAT DIAMETER     '/
     +T6,'    H = A/C HIT     XK = A/C KILLED    A = A/C DAMAGED       '/
     +T6,'    ACOVER = A/C OVER TARGET        ATAC = TARGETS ATTACKED '/
     +T6,'    PSM = PRCB. OF MISS. SURVIVAL   ACR1 = A/C IN FORMATICN'//
     +T6,'    W = XL * XH * D / 100.       PSM = PS ** W      '/
     +T6,'    PH = (1. - PSM)/PKH           H1 = ACR1 * PH    '/
     +T6,'    XK1 = H * PKH                 A1 = H1 - XK1     '/
     +T6,'    ACOVER = ACR1-H1-H2-H3        ATAC = ACOVER * XNPAS '/
     +T6,'    H4 = ACOVER * PH              XK4 = H4 * PKH      '/
     +T6,'    A3 = H4 - XK4                 ACNHT = ACR1-H1-H4   '/
     +T6,'    ACDAM = A1 + A4               ACKIL = XK1 + XK4    '//
     +T6,'          ENTER ANY INTEGER TO RETURN TO MENU 6          ')
      READ(5,*)IJK
C- #3 -------------------------------------------------------------------
      GO TO 150
C- #5 -------------------------------------------------------------------
C ******************** PLOTTING INFORMATICN ***************************
 8888 CALL FRTCMS('CLRSCRN ')
      WRITE(4,8889)
 8889 FORMAT(' ','          HELP FOR MENU (8)       '//
     *T6,'MENU (8) INCCRPORATES A DATA GENERATING ROUTINE TO SAVE'/
     *T6,'THE PROBABILITIES CF A KILL ( P(K) = 1 - P(S) ) FOR'/
     *T6,'LATER PLCTTING.  THIS PLOT MAY BE OBTAINED FROM A'/
     *T6,'TEKTRONIX DUAL SCREEN (TEK618) SYSTEM.  THE P(K)'/
     *T6,'AGAINST THE APPROPRIATE THREAT TYPES ARE PRESENTED.'//
     *T6,'    THREE DESIGNS CAN BE PLOTTED AT A TIME, FOR EXAMPLE'/
     *T6,'YOUR BASELINE DESIGN, YOUR FIRST DESIGN, AND ONE OTHER'/
     *T6,'MCDIFICATION.  YOU MUST HAVE DCNE AND CHCSEN TO SAVE'/
     *T6,'PLOTTING DATA FROM THREE RUNS.'//
     *T6,'    TO CBTAIN THE PLOT, FOLLOW THE SAME LOGON AND LINK'/
     *T6,'PROCEDURES YOU UTILIZED TO ACCESS VISAP, HOWEVER, ENTER'/
     *T6,'DISVIS INSTEAD OF VISAP. THEN ENTER STRPLT.'//
     *T6,'        ENTER ANY INTEGER TO RETURN TO MENU (8)')
      READ (5,*)IJK
      GO TO 8
C*********************************************************************
C        TRANSFER
```

```
C**********************************************************************
998       CALL FRTCMS('CLRSCRN ')
      WRITE(4,1998)
1998  FORMAT(' ','TRANSFER MENU, SELECT A CODE AS FOLLOWS:'/
     +T6,'MAIN MENU                        ',T51,'MM'/
     +T6,'  AIRCRAFT DESIGN SELECTION      ',T51,'DE'/
     +T6,'    A/C PERFORMANCE INDICATORS   ',T51,'AP'/
     +T6,'    SUSCEPTIBILITY FEATURES      ',T51,'SF'/
     +T6,'    VULNERABILITY FEATURES       ',T51,'VF'/
     +T6,'  COMBAT SCENARIO SELECTION      ',T51,'MS'/
     +T6,'    MISSION PROFILE              ',T51,'MP'/
     +T6,'    THREAT SELECTION             ',T51,'TH'/
     +T6,'  SUSCEPTIBILITY ASSESSMENT      ',T51,'SA'/
     +T6,'    PROBABILITY OF DETECTION     ',T51,'PD'/
     +T6,'    PROBABILITY OF HIT           ',T51,'PH'/
     +T6,'  VULNERABILITY ASSESSMENT       ',T51,'VA')
      WRITE(4,19981)
19981 FORMAT(' ',T6,'    P(K/H)                       ',T51,'KH'/
     +T6,'    P(K/D)                       ',T51,'KD'/
     +T6,'  SURVIVABILITY ASSESSMENT       ',T51,'SV'/
     +T6,'    P(S) 1:1 AAA (RADAR)         ',T51,'AR'/
     +T6,'    P(S) 1:1 AAA (OPTICAL)       ',T51,'AO'/
     +T6,'    P(S) 1:1 LOW ALT SAM         ',T51,'LS'/
     +T6,'    SINGLE SORTIE                ',T51,'SS'/
     +T6,'    CAMPAIGN EVALUATION          ',T51,'CE'/
     +T6,'TO EXIT OR PRINT RESULTS         ',T51,'EX'/)
      READ(5,2000) K9Q
      IF(K9Q.EQ.K1(1)) GO TO 110
      IF(K9Q.EQ.K1(2)) GO TO 120
      IF(K9Q.EQ.K1(3)) GO TO 130
      IF(K9Q.EQ.K1(4)) GO TO 140
      IF(K9Q.EQ.K1(5)) GO TO 150
      IF(K9Q.EQ.K2(1)) GO TO 210
      IF(K9Q.EQ.K2(2)) GO TO 220
      IF(K9Q.EQ.K2(3)) GO TO 230
      IF(K9Q.EQ.K3(1)) GO TO 310
      IF(K9Q.EQ.K3(2)) GO TO 320
      IF(K9Q.EQ.K4(1)) GO TO 410
      IF(K9Q.EQ.K4(2)) GO TO 420
      IF(K9Q.EQ.K5(1)) GO TO 510
      IF(K9Q.EQ.K5(2)) GO TO 520
      IF(K9Q.EQ.K6(1)) GO TO 610
      IF(K9Q.EQ.K6(2)) GO TO 630
      IF(K9Q.EQ.K6(3)) GO TO 640
      IF(K9Q.EQ.K6(4)) GO TO 650
      IF(K9Q.EQ.KK(3)) GO TO 999
      IF(K9Q.EQ.K1(6)) GO TO 100
      WRITE(4,1200)
```

```
      GO TO 998
C*****************************************************************
C         EXIT
C*****************************************************************
C- #3 ------------------------------------------------------------------
1061      CONTINUE
C**************DETERMINE TOGW ***************************************
          CALL ESRWT(ES,EC,EL,TW,WS,WT,
     @    IFS,IFV,JAM,IRCS,XMA,XMD,XMM,IWARN,ICHAFF,
     @    BLTOGW,TOGW)
C- #3 ------------------------------------------------------------------
C********* TO SAVE DATA ******************************
      REWIND 2
      WRITE(2,1012)TW,WS,WT,EC,EL,ES,JAM,IRCS,IWARN,ICHAFF,IFS,
     *       IFV,XMC,XMA,XMM,DSR,SAMH,SAMD,AAH,AAD,
     *       PDAR,PDSM,PHAR,PHSM,AVAA,PKHAA,VASM,PKHSM,PSAR,
     *       PSSM,ACR,X1NPAS,ACR1,NSRT,XNPASS,NS,
     *       ACR2,TOTSR,TOTACK,TOTACL,TOTACR,BLTOGW,TOGW
C*****************************************************************
C- #3 ------------------------------------------------------------------
      CALL FRTCMS('CLRSCRN ')
      WRITE (4,9200)TW,WS,WT,XMD,AAH,XMA,AAD,XMM,SAMH,SAMD
      WRITE (4,2220)JAM,IFS,IRCS,IFV,IWARN,ICHAFF
      WRITE (4,9201)
      WRITE (4,9202)PSAR,PDAR,PHAR,PKHAA
      WRITE (4,9204)PSSM,PDSM,PHSM,PKHSM
      WRITE (4,9220)
      WRITE (4,9220)
      WRITE (4,9205)
      WRITE (4,9206)ACR1,NSRT,XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR
      WRITE (4,9220)
      WRITE (4,9207)BLTOGW,TOGW
      WRITE (4,8282)
      WRITE (4,8282)
      GO TO 8
C*****************************************************************
999        CONTINUE
         CALL FRTCMS('CLRSCRN ')
      WRITE(4,9999)
9999  FORMAT('0',' TO PRINT YOUR RESULTS AND EXIT ENTER  "0"'/
     +,' TO PRINT YOUR RESULTS AND REENTER PROGRAN ENTER "1"'/
     +,' TO EXIT WITHOUT A PRINT ENTER "2"')
      READ(5,*)IJK
      IF(IJK.EQ.2) GO TO 99999
C- #4 ------------------------------------------------------------------
      WRITE (6,9200)TW,WS,WT,XMD,AAH,XMA,AAD,XMM,SAMH,SAMD
      WRITE (6,2220)JAM,IFS,IRCS,IFV,IWARN,ICHAFF
      WRITE (6,9220)
```

```
      WRITE (6,9201)
      WRITE (6,9202)PSAR,PCAR,PHAR,PKHAA
      WRITE (6,9204)PSSM,PDSM,PHSM,PKHSM
      WRITE (6,9220)
      WRITE (6,9205)
      WRITE (6,9206)ACR1,NSFT,XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR
      WRITE (6,9220)
      WRITE (6,9207)BLTOGW,TOGW
      IF(IJK.EQ.1) GO TO 1022
C-  #3,#4 -------------------------------------------------------------------
9200  FORMAT('1',T25,'** LONG RANGE STRIKE AIRCRAFT **'///
     *        T30,'* PERFORMANCE FEATURES'//
     *        ,'      THRUST TO WEIGHT',T31,F8.2,
     *        T42,'    WING LOADING',T65,F8.2/
     *        ,'      ORDNANCE WEIGHT',T31,F8.2///
     *        ,' * MISSION PARAMETERS',T40,' * THREAT PARAMETERS'//
     *        ,'      PENETRATION DISTANCE',T31,F8.2,
     *        T42,'    A/A DENSITY',T65,F8.2/
     *        ,'      PENETRATION ALTITUDE',T31,F8.2,
     *        T42,'    A/A DIAMETER',T65,F8.2/
     *        ,'      PENETRATION MACH NBR.',T31,F8.2,
     *        T42,'    SAM DENSITY',T65,F8.2/
     *        T42,'    SAM DIAMETER',T65,F8.2//)
C-  #3,#4 -------------------------------------------------------------------
9201  FORMAT ('0','          * SURVIVABILITY ASSESSESSMENT:'//
     *         T18,' P(S)       P(D)      P(H)      P(K/H)')
9202  FORMAT (' ',' VS A/A MISSILE  ',4(F4.2,5X))
9204  FORMAT (' ',' VS HIGH ALT SAM ',4(F4.2,5X))
9205  FORMAT ('0','          * CAMPAIGN ANALYSIS:'/)
9206  FORMAT ('0',' INITIAL A/C    ',F8.0,'     NUMBER OF RAIDS     ',I7,/
     +         '  PASSES/SORTIE ',F8.0,'     SORTIES FOR REPAIR ',I5,/
     +         '  A/C READY     ',F8.0,'     TOTAL SORTIES      ',F8.0,/
     +         '  TOTAL TARGETS ',F8.0,'     TOTAL A/C LOST     ',F8.0,/
     +         '  IN REPAIR     ',F8.0,/)
9220  FORMAT (' ')
8282  FORMAT (8(' ')/)
9207  FORMAT ('0',' BASELINE TOGW ',F10.2,T36,'ENHANCED TOGW',F10.2)
99999     STOP
          END
        SUBROUTINE SSRPDA(JAMS,IRCSS,PDCS)
        REAL PDCM(10)
        DATA PDCM/.99,.986,.985,.98,.96,.93,.91,.87,.805,.76/
        PDCS=PDCM(IRCSS+1)
         IF(JAMS.NE.0) PDCS=PDCM(10)
        RETURN
       END
      SUBROUTINE SSRPDS(JAMMER,RCS,DSR,PDF)
      INTEGER A,B,RCS,JAMMER,Q
```

```
      DIMENSION H(2,9,6),F(101),PDT(101),XX(101)
      DATA H/37.,10.,36.,10.,31.,9.,29.,8.,26.,8.,22.5,6.,21.,6.,17.5,5.
     A,13.,4.,
     B23.5,7.,21.5,5.5,17.,5.,15.2,4.2,11.,3.,8.8,2.,7.5,1.9,5.5,1.8,0.,
     C1.,
     D16.8,5.,15.5,4.8,12.,3.7,10.5,3.2,7.9,2.5,6.,1.9,4.8,1.1,3.5,
     C.85,0.,1.,
     D10.8,3.1,8.3,2.4,7.5,2.2,5.6,1.7,4.2,1.3,3.5,1.,0.,1.,0.,1.,0.,1.
     E,6.3,1.4,5.2,1.4,4.7,1.4,0.,1.,0.,1.,0.,1.,0.,1.,0.,1.,0.,1.
     F,4.3,1.3,3.4,1.1,0.,1.,0.,1.,0.,1.,0.,1.,0.,1.,0.,1.,0.,1./
C****************** CANT USE ZERO AS A INDICIES***********************
      I=RCS+1
      J=JAMMER+1
C******************* SELECTS PROPER MEAN AND DEVIATIONS****************
      X=H(1,I,J)
      S=H(2,I,J)
C******************** CONSTANTS FOR EASE CF WRITING*****************
C- #1 ---------------------------------------------------------------------
      CON1=1./(S*SQRT(2.*3.14159))
      CON2=-.5/S**2
C********************INTEGRATION START AT MEANS + 4 DEVIATIONS********
      XI=X+4*S
C********************100 STEPS IN ITEGRATION***********************
      STEP=-S/12.5
C***************** INITIAL VALUES TO START INTEGRATION***************
      F(1)=0.0
      XX(1)=XI
      PDF=0.
      PD=0.
C*******************INTEGRATION LOOP*************************************
      DO 10 JJ=1,100
            F(JJ+1)= CON1*EXP(CON2*(XI-X)**2)
            XI=XI+STEP
            AREA=-.5*STEP*(F(JJ+1)+F(JJ))
            PDT(JJ+1)=PD
               IF(XI.LT.DSR)GO TO 5
                   PDF=PD
5              CONTINUE
            XX(JJ+1)=XI
            PD=PD+AREA
10     CONTINUE
C####################SETS UP A MINIMUM PD OF .1
       IF(PDF.GT.0.01) GO TC 20
       PDF=.100
20        CONTINUE
       RETURN
       END
      SUBROUTINE SSRPHR(WS,XMM,XMA,IWARN,ICHAFF,DSR,PDAM)
```

```
C*****************************************************************
C************** A/A RADAR MISSILE P(H) ****************************
C*****************************************************************
              WSS = WS/100.
              XMS = XMA/10000.
             XXMR = DSR
C**************   SAM PH ******************************************
              PH = 1.0
          CALL SRFC (ICHAFF,FC)
C**************   MODIFIED FOR CHAFF *******************************
              PH1 = PH * FC
          CALL SRFA (XXMR,IWARN,FA)
C**************   MODIFIED FOR MANUVERING *************************
        FM = 1.+.961 * WSS**2 - .08246 * XMS * XMM
        IF(FM.LT.0.01) FM = 0.01
        IF(FM.GT.1.0)  FM = .99
              XMF = 1. - (1.- FM) * FA
          PDAM = PH1 * XMF
         RETURN
      END
      SUBROUTINE SSRPHS(WS,XMM,XMA,IWARN,ICHAFF,DSR,PDAM)
         WSS=WS/100.
         XMS=XMA/10000.
         XXMR = DSR
C**************   SAM PH ******************************************
              PH = .95595
          CALL SRFC (ICHAFF,FC)
C**************   MODIFIED FOR CHAFF *******************************
              PH1 = PH * FC
          CALL SRFA (XXMR,IWARN,FA)
C**************   MODIFIED FOR MANUVERING *************************
        FM = 1.-.35393 * XMM**2+ .169674 * WSS * XMS
        IF(FM.LT.0.01)FM = 0.01
        IF(FM.GT.1.00)FM = 0.99
              XMF = 1. - (1.- FM) * FA
          PDAM = PH1 * XMF
          RETURN
          END
      SUBROUTINE SRFA(XXMRS,IWARN,FAS)
C*******************************************************************
C******* ALERTION FACTOR *******************************************
      REAL MRM(28),FVM(28),FESM(12),MRSM(12)
         DATA FESM/1.,.99999,.97,.91,.82,.69,.53,.35,.22,.137,.065,0./
         DATA MRSM/0.,36.,40.,50.,60.,70.,80.,90.,100.,110.,120.,140./
      DATA MRM/0.,1.,1.94,2.,2.54,3.,3.08,3.48,3.78,4.,4.05,4.23
     A,4.35,4.45,4.55,4.68,4.8,4.9,5.05,5.35,5.8,6.,6.39,7.,7.36
     B,8.,9.,10./
      DATA FVM/1.,.995,.95,.943,.9,.868,.85,.8,.75,.712,.7,.65,.6
```

```
     A,.55,.5,.45,.4,.357,.35,.3,.25,.216,.2,.165,.15,.13,.114,.101/
      IF(IWARN.EQ.1)GO TC 15
      KEY=1
5     CONTINUE
         KEY=KEY+1
      IF(MRM(KEY).LT.XXMRS) GO TO 5
      DELTAX=MRM(KEY)-MRM(KEY-1)
      DELTAY=FVM(KEY)-FVM(KEY-1)
      FVS=((XXMRS-MRM(KEY-1))/DELTAX)*DELTAY+FVM(KEY-1)
      FAS = FVS
      GO TO 20
15    CONTINUE
         J=1
10       CONTINUE
         J=J+1
         IF(XXMRS.GE.MRSM(J)) GO TO 10
         DX= MRSM(J-1)-MRSM(J)
         DY= FESM(J-1)-FESM(J)
         FES=((XXMRS-MRSM(J-1))/DX)*CY+FESM(J-1)
         FAS = FES
20     CONTINUE
         RETURN
         END
C*************************************************************************
C********* CHAFF FACTOR ***************************************************
C*************************************************************************
         SUBRCUTINE SRFC(ICHAFF,FC)
         REAL PBTSM(17)
         DATA PBTSM/.00,.19,.35,.49,.6,.68,.74,.8,.83,.86,.9,.92,.935,
     A              .95,.96,.97,.98/
         PBTS=0.
         IF(ICHAFF.EQ.0) GO TO 10
C***********NUMBER OF BUNDLES DEFAULTED TC FOUR **************************
         NBUNDS = 4
         PBTS=PBTSM(NBUNDS+1)
10       FC = 1. - PBTS
         RETURN
         END
C*************************************************************************
C********* VULNERABLE AREA AND P(K/H) VS A/A RADAR MISSILE ***************
C*************************************************************************
         SUBROUTINE SSRAVA(IFS,IFV,AV,UPKHS)
         F1=0.
         F2=0.
         F3=0.
         F4=0.
         IF (IFS.EQ.2) F1 = 1.
         IF (IFS.EQ.3) F2 = 1.
```

```
      IF (IFS.NE.4) GC TC 5
           F1 = 1.
           F2 = 1.
5         CONTINUE
      IF ((IFV.EQ.2).CR.(IFV.EQ.3)) F3 = 1.
      IF ((IFV.EQ.4).OR.(IFV.EQ.5)) F4 = 1.
      IF (IFV.NE.6) GC TC 10
           F3 = 1.
           F4 = 1.
10        CONTINUE
      TOT = F1+F2+F3+F4
      IF(TOT.GT.3.5) GO TC 4
      IF(TOT.GT.2.5) GO TO 3
      IF(TOT.GT.1.5) GO TC 2
      IF(TOT.GT.0.5) GO TO 1
      UPKHS=1.
      GO TC 20
1     UPKHS=.983*F1+.998*F2+.991*F3+.975*F4
      GO TO 20
2     UPKHS=.983*F1*F2+.973*F1*F3+.911*F1*F4+.989*F2*F3+.971*F2*F4+.963*
     @  F3*F4
      GO TO 20
3     UPKHS=.973*F1*F2*F3+.911*F1*F2*F4+.878*F1*F3*F4+.959*F2*F3*F4
      GO TO 20
4     UPKHS=.877
20    AV = UPKHS * 600.
      RETURN
      END
C***********************************************************************
C********* VULNERABLE AREA AND P(K/H) VS HIGH ALTITUDE SAM *************
C***********************************************************************
      SUBROUTINE SSRAVS(IFS,IFV,JAM,IRCS,AVS,PKHS)
      REAL CEP(9,6),CEPSM(14),FCEPSM(14)
      DATA CEP/50. ,50. ,50. ,50. ,50. ,50.  ,63.  ,110. ,300.,
     A          50. ,50. ,50. ,50. ,5C. ,63.  ,82.  ,140. ,410.,
     B          50. ,50. ,50. ,50. ,62. ,105. ,140. ,260. ,790C.,
     C          50. ,50. ,59. ,75. ,110.,182. ,265. ,490. ,1000.,
     D          63. ,73. ,105.,135.,2C0.,370. ,540. ,1000.,1000.,
     E          125.,155.,270.,350.,5C0.,1000.,1000.,1000.,1000./
      DATA CEPSM/0.,50.,90.,165.,200.,250.,320.,400.,520.,600.,700.,
     A           800.,1000.,1500./
      DATA FCEPSM/1.,1.,.9,.7,.6,.5,.4,.3,.2,.14,.1,.06,.02,.0/
C********* INITIALLIZING STATMENTS **************************************
      FCEPS=0.
      CEPS=0.
      F1 = 0.
      F2 = 0.
      F3 = C.
```

```
      F4 = 0.
C********* ZFRO CANNOT BE AN INDEX **************************************
      IY=JAM+1
      IX=IRCS+1
      J=0
15    CONTINUE
      J=J+1
      IF(CEPS.GE.CEPSM(J)) GO TO 15
C********* GRAPH PCINT EXTRACTION **************************************
      DX= CEPSM(J-1)-CEPSM(J)
      DY= FCEPSM(J-1)-FCEPSM(J)
      FCEPS=((CEPS-CEPSM(J-1))/DX)*DY+FCEPSM(J-1)
      CEPS = CEP(IX,IY)/FCEPS
C********* MAX VALUE OF CEP IS 1000 FT**********************************
      IF(CEPS.GT.1000.) CEPS=1000.
      IF (IFS.EQ.2) F1 = 1.
      IF (IFS.EQ.3) F2 = 1.
      IF (IFS.NE.4) GC TC 5
         F1 = 1.
         F2 = 1.
5     CONTINUE
      IF ((IFV.EQ.2).CR.(IFV.EQ.3)) F3 = 1.
      IF ((IFV.EQ.4).CR.(IFV.EQ.5)) F4 = 1.
      IF (IFV.NE.6) GO TO 10
         F3 = 1.
         F4 = 1.
10    CONTINUE
      TOT = F1+F2+F3+F4
      IF(TOT.GT.3.5) GO TC 4
      IF(TCT.GT.2.5) GO TO 3
      IF(TOT.GT.1.5) GO TC 2
      IF(TOT.GT.0.5) GO TC 1
      PKHS=1.
      GC TO 20
1    P1=(.99857-.C000529606*CEPS+.0C0000341377*CEPS**2)*F1
     P2=(.99951-.C000073615*CEPS-.C0000C042731*CEPS**2)*F2
     P3=(.98418-.0000777649*CEPS-.0C000C152060*CEPS**2)*F3
     P4=(.98867-.000114141*CEPS+.00C000115539*CEPS**2)*F4
     PKHS=F1+P2+P3+P4
     GO TO 20
2    P1=(1.C02C7-.000127961*CEPS+.000000134138*CEPS**2)*F1*F2
     P2=(.98914-.0000836242*CEPS+.0C0000365215*CEPS**2)*F1*F3
     P3=(.97357-.000117606*CEPS-.0C0000149176*CEPS**2)*F1*F4
     P4=(.99001-.0000246527*CEPS-.0000000471454*CEPS**2)*F2*F3
     P5=(.98489-.000238044*CEPS+.000000126457*CEPS**2)*F2*F4
     P6=(.96155-.C000721483*CEPS-.0000000388464*CEPS**2)*F3*F4
     PKHS=F1+P2+P3+P4+P5+P6
     GO TC 20
```

```
3     P1=(.99247-.000176426*CEPS+.00000169423*CEPS**2)*F1*F2*F3
      P2=(.96715-.000316741*CEPS+.0000000774279*CEPS**2)*F1*F2*F4
      P3=(.94733-.000349737*CEPS+.0000000451736*CEPS**2)*F1*F3*F4
      P4=(.92959-.000333817*CEPS+.000000124132*CEPS**2)*F2*F3*F4
      PKHS=P1+P2+P3+P4
      GO TO 20
4     PKHS=.86150-.000404261*CEPS+.000000C113008*CEPS**2
20    CONTINUE
      AVS = PKHS * 600.
      RETURN
      END
       SUBROUTINE SORT(
     &XL1,XH1,D1,PKH1,PS1,   XL2,XH2,D2,PKH2,PS2,  XL3,XH3,D3,PKH3,PS3,
     &ACR1,NSRT,XNPAS,NS,           ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
C**********************************************************************
C        XL-PENDIS      H-THREAT DENSITY    D- THREAT DIAMETER
C
C**********************************************************************
C
         W1 = XL1 * XH1 * D1 / 100.
         W2 = XL2 * XH2 * D2 / 100.
         W3 = XL3 * XH3 * D3 / 100.
C
         PSM1 = PS1 ** W1
         PSM2 = PS2 ** W2
         PSM3 = PS3 ** W3
C
         PH1 = (1. - PSM1)/PKH1
         PH2 = (1. - PSM2)/PKH2
         PH3 = (1. - PSM3)/PKH3
C
C**************THREAT 1**************
             H1 = ACR1 * PH1
             XK1 = H1 * PKH1
             A1 = H1 - XK1
C**************THREAT 2**************
                H2 = (ACR1-H1) * PH2
                XK2 = H2 * PKH2
                A2 = H2 - XK2
C**************THREAT 3**************
                   H3 = (ACR1-H1-H2) * PH3
                   XK3 = H3 * PKH3
                   A3 = H3 - XK3
C***************OVER TARGET**************
               ACOVER = ACR1-H1-H2-H3
               ATAC = ACOVER * XNPAS
C***************EGRESS*****************
C**************THREAT 1**************
```

```
                  H4 = ACOVER * PH1
                  XK4 = H4 * PKH1
                  A4 = H4 - XK4
C***************THREAT 2**************
                     H5 = (ACOVER-H4) * PH2
                     XK5 = H5 * PKH2
                     A5 = H5 - XK5
C***************THREAT 3**************
C- #1 -----------------------------------------------------------------
                       H6 = (ACOVER-H4-H5) * PH3
                       XK6 = H6 * PKH3
                       A6 = H6 - XK6
C***************TOTALS FOR SORTIE********
                   ACNHT = ACR1-H1-H2-H3-H4-H5-H6
                   ACDAM = A1 + A2 + A3 + A4 + A5 + A6
                   ACKIL = XK1 + XK2 + XK3 + XK4 + XK5 + XK6
C**************FOR NEXT SORTIE***********
                        ACR2 = ACNHT
                        TOTSR = ACR1
                        TOTACK = ATAC
                        TOTACL = ACKIL
                        TOTACR = ACDAM
      RETURN
        END
      SUBROUTINE CAMP(
     &XL1,XH1,D1,PKH1,PS1,  XL2,XH2,D2,PKH2,PS2,  XL3,XH3,D3,PKH3,PS3,
     &ACR1,NSRT,XNPAS,NS,           ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
C**********************************************************************
C      XL-PENDIS     H-THREAT DENSITY     D- THREAT DIAMETER
C
C**********************************************************************
       DIMENSION ACR(200)
         TOTSR  = 0.
         TOTACK = 0.
         TOTACL = 0.
         TOTACR = 0.
C
       W1 = XL1 * XH1 * D1 / 100.
       W2 = XL2 * XH2 * D2 / 100.
       W3 = XL3 * XH3 * D3 / 100.
C
       PSM1 = PS1 ** W1
       PSM2 = PS2 ** W2
       PSM3 = PS3 ** W3
C
       PH1 = (1. - PSM1)/PKH1
       PH2 = (1. - PSM2)/PKH2
       PH3 = (1. - PSM3)/PKH3
```

```
C
      ACR(1)= ACR1
      DO 10 I = 1,NSRT
C**************INGRESS*****************
          H1 = ACR(I) * PH1
          XK1 = H1 * PKH1
          A1 = H1 - XK1
             H2 = (ACR(I)-H1) * PH2
             XK2 = H2 * PKH2
             A2 = H2 - XK2
                H3 = (ACR(I)-H1-H2) * PH3
                XK3 = H3 * PKH3
                A3 = H3 - XK3
C***************OVER TARGET*************
           ACOVER = ACR(I)-H1-H2-H3
           ATAC = ACOVER * XNPAS
C***************EGRESS******************
          H4 = ACOVER * PH1
          XK4 = H4 * PKH1
          A4 = H4 - XK4
             H5 = (ACOVER-H4) * PH2
             XK5 = H5 * PKH2
             A5 = H5 - XK5
C- #1 ------------------------------------------------------------------
                H6 = (ACOVER-H4-H5) * PH3
                XK6 = H6 * PKH3
                A6 = H6 - XK6
C**************TOTALS FOR SORTIE********
           ACNHT = ACR(I)-H1-H2-H3-H4-H5-H6
           ACDAM = A1 + A2 + A3 + A4 + A5 + A6
           ACKIL = XK1 + XK2 + XK3 + XK4 + XK5 + XK6
C*************FOR NEXT SORTIE***********
                 TOTACR = TOTACR+ACDAM
                 ACROUT = TOTACR/FLOAT(NS)
                 TOTACR = TOTACR-ACROUT
                 ACR(I+1) = ACNHT + ACROUT
                 ACR2 = ACR(I+1)
                 TOTSR = TOTSR + ACR(I)
                 TOTACK = TOTACK + ATAC
                 TOTACL = TOTACL + ACKIL
10       CONTINUE
      RETURN
         END
         SUBROUTINE ESRWT(ES,EC,EL,TW,WS,WT,
C***********************************************************************
C********* TOGW DETERMINATION SUBROUTINE ********************************
C***********************************************************************
     @   IFS,IFV,JAM,IRCS,PENALT,PENDIS,PENMAC,IWARN,ICHAFF,
```

```
@     BLTOGW,TOGW)
      REAL A,B,C,D,E,F,G,H,I,J
      TOGW = C.
      BLTOGW = 0.
      A = TW
      B = WS
      C = PENALT
      D = PENMAC
      E = PENDIS
      F = WT
      G = 0.
      H = 0.
      I = 0.
      J = 0.
C*************** BLTCGW ****************************************************
C- #1 -----------------------------------------------------------------------
      BLTCGW = 95528.1-2.43453*C-1636690.*G+5771.94*A*D+1.00566*A*H
@       +.00404312*B*C-1.41229*B*E-13033.3*B*G+.000023164*C*C
@       -.388375*C*D+.0000132684*C*H+.872068*C*I+138.061*D*E
@       +1.30706*D*F+1611310*D*G+.411576*D*H+37639.65*D*J+5560.39*E*G
@       -22.6367*F*I-4.18043*F*J+13373400.*G*G+41.0552*G*H
@       -1827710.*G*I+2504410.*G*J
C***************************************************************************
C       A/C TOGW OF DESIGN WITH SURVIVABILITY ENHANCEMENT
C***************************************************************************
C       THE FOLLCWING ASSUMPTION MACE;
C           ALL SELF-SEALING DONE FCR 23 MM
C           TWO WING TANKS, FOUR FUSELAGE TANKS, PLUS SUMP TANK(S)
C           DUAL SUMP TANKS HAVE EQUAL VCLUMN OF SINGLE SUMP TANK
C           EACH TANK HCLDS 1/7 OF TOTAL VOLUMN
C           INTERNAL FOAM VICE ULLAGE INERTING
C           FIRE EXTINGUISHING VICE VOIC FOAM
C***************************************************************************
      IF(JAM.EQ.C) GO TC 40
        SREF=BLTCGW/WS
C- #1 -----------------------------------------------------------------------
        T1=1./(1.+0.1296**PENMAC**2)**.648
        T2=.8934/PENMAC**2
        T3=1.793-1.036/(PENMAC**2)+.162/(PENMAC**4)
      G = (0.0536*T1+T2+T3*PENMAC**.5)/SREF
40      CONTINUE
C***************************************************************************
C       WEIGHT INCREASE CALCULATIONS
C***************************************************************************
C*******  FR = FUEL REQUIRED FOR MISSION ************************************
C- #1 -----------------------------------------------------------------------
      FR=9499.85-.772933*C+24414.*D-464069.*A*G+.414073*A*H
*       -.00681604*B*F
```

```
     @ -19611.*B*G+345.404*B*I+.0000173927*C*C-.545816*C*D-.0011389*C*E
     @  +.31419*C*I+69.4257*D*E+.68633*D*F+944143.*D*G+.0876982*D*H
     @  +19218.8*D*J+2979.94*E*G-23.2469*F*I+10929000.*G*G+20.0457*G*H
     @  -1573550.*G*I+1517220.*G*J+.C000117662*H*H
C******* WEIGHT INCREASE DUE TO SELF-SEALING ************************
         XNT = 2.
         IF((IFS.EQ.1).OR.(IFS.EQ.2)) XNT = 0.
         IF(IFS.EQ.3) XNT = 1.
      WSSP = 1.49*(2.2*8./7.-1.)*(1./7.)**.75*(FR/6.6)**.64*XNT**.11
C******* WEIGHT INCREASE DUE TO INTERNAL FOAM ************************
      WF = 0.
         IF((IFV.EQ.2).OR.(IFV.EQ.6)) WF = .C186 * FR/6.6
C******* WEIGHT INCREASE DUE TO FIRE EXTINGUISHING ******************
      WFE = 0.
         XV = 4./3. * ( EC + ES) * EC * EL
         IF((IFV.EQ.5).OR.(IFV.EQ.6)) WFE = 10.5 * XV**.26
C******* WEIGHT INCREASE DUE ULLAGE INERTING *********************
      WIRT = .015 * (FR/6.6)**.92 * XNT
C******* WEIGHT INCREASE DUE EXTERNAL FOAM ***************************
      WEF = 0.
         IF(IFV.EQ.4) WEF = 2.65*(BLTOGW-FR)*.001
C******* WEIGHT INCREASE DUE TO RAM **********************************
         XTT = .1
         XS = 0.
         IF(IRCS.EQ.1) XS = 10.
         IF((IRCS.EQ.2).OR.(IRCS.EQ.3)) XS = 50.
         IF(IRCS.EQ.4) XS = 60.
         IF(IRCS.EQ.5) XS = 70.
         IF(IRCS.EQ.6) XS = 80.
         IF((IRCS.EQ.7).OR.(IRCS.EQ.8)) XS = 80. + BLTOGW/WS *.63
         WRAM = XTT * XS * 23.8
C******* WEIGHT INCREASE DUE TO RWR **********************************
        WEW = 0.
        IF(IWARN.EQ.1) WEW = 50.
C******* WEIGHT INCREASE DUE TO RADAR JAMMER *************************
        WJW = 0.
        IF(JAM.EQ.1) WJW = 80.
        IF(JAM.EQ.2) WJW = 100.
        IF(JAM.EQ.3) WJW = 200.
        IF(JAM.EQ.4) WJW = 500.
        IF(JAM.EQ.5) WJW = 1000.
C******* WEIGHT INCREASE DUE TO CHAFF DISPENSER ***********************
        WCD = 0.
        IF(ICHAFF.EQ.1) WCD = 86.
C******* WEIGHT INCREASE DUE TO SUBMERGED STORE ***********************
        WSOR = 0.
        IF((IRCS.EQ.7).OR.(IRCS.EQ.8)) WSOR = 1.13 * WT/100.
C********************************************************************
```

```
C****** TOTAL WEIGHT INCREASE ************************************
       H =  WSSP+WF+WFE+WIRT+WEF+WRAM+WEW+WJW+WCD+WSOR
C****************************************************************
C****** TOTAL TOGN OF ENHANCED A/C*********************************
C****************************************************************
C- #1 ----------------------------------------------------------------
        TOGW = 95528.1-2.43453*C-1636690.*G+5771.94*A*D+1.00566*A*H
     @  +.00404312*B*C-1.41229*B*E-13033.3*B*G+.000023164*C*C
     @  -.388375*C*D+.0000132684*C*H+.872068*C*I+138.061*D*E
     @  +1.30706*D*F+1611310.*D*G+.411576*D*H+37639.65*D*J+5560.39*E*G
     @  -22.6367*F*I-4.18043*F*J+13373400.*G*G+41.0552*G*H
     @  -1827710.*G*I+2504410.*G*J
         RETURN
         END
```

```
C***********************************************************************
C**                                                                   **
C**      STRPLT < STRIKE PLOT >                                       **
C**      PROGRAM TO GRAPH P(K)'S VS. THREATS AGAINST                  **
C**      LONG RANGE STRIKE AIRCRAFT                                   **
C**                                                                   **
C***********************************************************************
      DIMENSION YC(3),Y1(2),Y2(2),Y3(2),XC(2),IPKRAY(400)
     *          ,LABEL(12)
      DATA LABEL/' ',' ',' ','A/A ','MISS','ILE ',
     *           'SAM ',' ',' ',' ',' ',' '/
      DATA YC/0.,0.,0./
      DATA XC/1.5,2.5/
C
      READ(8,800)(Y1(I),I=1,2),(Y2(I),I=1,2),(Y3(I),I=1,2)
  800 FORMAT(F4.2)
C
      CALL TEK618
      CALL HWROT('MOVIE')
      CALL BLOWUP (1.4)
      CALL PAGE(8.5,11.)
      CALL NOBRDR
      CALL AREA2D(6.,8.5)
      CALL XNAME('THREATS$',100)
      CALL YNAME('P(()K())$',100)
      CALL SWISSM
      CALL SHDCHR(90.,1,.003,1)
      CALL BASALF('STAND')
      CALL MIXALF('L/CSTD')
      CALL HEADIN('LONG RANGE STRIKE AIRCRAFT$',100,1.5,2)
      CALL HEADIN('L(OSS) R(ATE) VS. T(HREAT) T(YPE)$',100,1.1,2)
      CALL YREVTK
      CALL YAXANG(0.)
      CALL XTICKS(0)
      CALL XAXEND('NOENDS')
      CALL YAXEND('NOLAST')
      CALL SWISSL
      CALL HEIGHT(.12)
      CALL FRAME
      CALL THKFRM(.10)
      CALL XLABGR(LABEL,3,4,0.,.1,1.1)
      CALL FLREC(0.01,8.1,4.29,0.6,0)
      CALL BLREC(4.3,7.7,1.7,1.0,0)
      CALL BLKEY(IC)
      CALL CLUSTR(3,.08)
      CALL HEIGHT(.08)
      CALL BARDCC('SECOND','OUTSIDE',2)
      CALL BLBAR
```

```
CALL  VBARS('LABEL',Y0,Y1,2)
CALL  VBARS('LABEL',Y0,Y2,2)
CALL  VBARS('LABEL',Y0,Y3,2)
CALL  HEIGHT(.05)
CALL  DOT
CALL  GRID(0,2)
CALL  RESET('DOT')
CALL  HEIGHT(.10)
CALL  BLOFF(IC)
MAXLIN=LINEST(IPKRAY,400,40)
CALL  LINES('B(ASELINE)$',IPKRAY,1)
CALL  LINES('1ST D(ESIGN)$',IPKRAY,2)
CALL  LINES('2ND D(ESIGN)$',IPKRAY,3)
CALL  LEGEND(IPKRAY,3,4.5,7.6)
CALL  ENDPL(C)
CALL  DONEPL
STOP
END
```

APPENDIX G

SUPPORT AND SUPPLT PROGRAM LISTINGS

```
C*****************************************************************************
C**                                                                         **
C**     SUPFCRT                                                             **
C**     PRCGRAM TO ASSESS CLCSE AIR SUPPORT AIRCRAFT SURVIVABILITY          **
C**                                                                         **
C*****************************************************************************
C             CLCSE AIR SUPPORT AIRCRAFT
C
C           THESE LINE NUMBERS ARE FOR EASY REFERENCE
C
C         MAIN MENU                                            1, 100, 1001
C         AIRCRAFT DESIGN SELECTION                            2, 110, 1110
C                A/C PERFCRMANCE INDICATORS                   21, 210, 1210
C                SUSCEPTIBILITY FEATURES                      22, 220, 1220
C                      JAMMERS 221  RCS 222  RWR 223  CHAFF 224
C                VULNERABILITY FEATURES                       23, 230, 1230
C          COMBAT SCENARIC SELECTION                           3, 120, 1120
C                MISSION PRCFILE                              31, 310, 1310
C                THREAT SELECTICN                             32, 320, 1320
C          SUSCEPTIBILITY ASSESMENT                            4, 130, 1130
C                PROBABILITY CF DETECTICN                     41, 410, 1410
C                PROBABILITY CF HIT                           42, 420, 1420
C                         AAA RADAR                               421
C                         AAA OPTICAL                             422
C                         LCW ALT SAM                             423
C          VULNERABILITY ASSESMENT                             5, 140, 1140
C                         AAA                                     510
C                         LCW ALY SAM                             520
C          SURVIVABILITY ASSESSMENT                            6, 150, 1150
C                P(S) 1:1 AAA (RADAR)                             610, 618
C                P(S) 1:1 AAA (CPTICAL)                           620, 628
C                P(S) 1:1 LOW ALT SAM                             630, 638
C                SINGLE SCRTIE                                    640, 1640
C                CAMPAIGN EVALUATION                              650, 1650
C          HELP                                                   997
C          TRANFER                                                998
C          EXIT                                                   999
C
      IMPLICIT REAL*4(A-H,C-Z),INTEGER*4(I-N)
C
      DIMENSION KK(4),K1(6),K2(3),K3(2),K4(2),K5(2),K6(5),
C- #5 ---------------------------------------------------------------------
     *          JJ(2),PKAR(3),PKAO(3),PKSM(3)
C
      DATA K1/'DE','MS','SA','VA','SV','MM'/
      DATA K2/'AP','SF','VF'/
      DATA K3/'MP','TH'/
      DATA K4/'PD','PH'/
```

```
      DATA K5/'KH','KD'/
      DATA K6/'AR','AO','LS','SS','CE'/
      DATA KK/'HP','TN','EX','RT'/
C-  #5 -----------------------------------------------------------------
      DATA JJ/'Y','N'/
C
C-  #3 -----------------------------------------------------------------
C********* TO SAVE DATA ***********************************************
C
      CALL FRTCMS('CLRSCRN ')
      WRITE(4,1010)
1010  FORMAT(' ','DATA MODE SELECTION, ENTER A CODE AS FOLLOWS:'//
     *T6,'IF THIS IS YOUR FIRST TIME THROUGH SUPPORT OR YOU WISH'/
     *T6,'TO USE THE DEFAULT VALUES/PARAMETERS ENTER...0 '//
     *T6,'TO USE DATA SAVED FROM YOUR LAST RUN ENTER...1 '///
     *T20,'WARNING'//
     *T6,'--DO NOT ENTER 1 IF THIS IS YOUR FIRST RUN OR IF YOU HAVE'/
     *T6,'ERASED YOUR SUPPORT DATA FILE FROM YOUR DISK--'/)
C
      READ(4,1011)I1
1011  FORMAT(I1)
      IF(I1.EQ.0)GO TO 1021
      IF(I1.EQ.1)GO TO 1022
1022  CONTINUE
      REWIND 3
      READ(3,1012)TW,WS,WT,B,XL,W,EC,ED,EL,JAM,IRCS,IWARN,ICHAFF,IFS,
     *       IFV,IFE,IEA,IEP,ICS,ICA,XMR,XMA,XMT,AAAH,AAAD,SAMH,SAMD,
     *       PDAO,PDAR,PDSM,PHR,PHO,PHSM,VAAAA,PKHAAA,VASM,PKHSM,PSAR,
     *       PSAO,PSSM,ACR,X1NPAS,ACR1,NSRT,XNPASS,NS,
     *       ACR2,TOTSR,TOTACK,TOTACL,TOTACR,BLTOGW,TOGW
1012  FORMAT(' ',5G12.4)
      GO TO 1
C
1021  CONTINUE
      DATA TW/.55/,WS/90./,WT/8000./,B/40./,XL/40./,W/4./,EC/1.5/,ED/3.5
     &/, EL/12./
      DATA JAM/0/,IRCS/0/,IWARN/0/,ICHAFF/0/
      DATA IFS/1/,IFV/1/,IFE/1/,IEA/1/,IEP/1/,ICS/1/,ICA/1/
      DATA XMR/150./,XMA/10000./,XMT/60./
      DATA AAAH/.01/,AAAD/3./,SAMH/.0017/,SAMD/20./
      DATA PDAO/1./,PDAR/1./,PDSM/.9988/
      DATA PHR/.9007/,PHO/.1416/,PHSM/.1315/
      DATA VAAAA/100./,PKHAAA/.4531/,VASM/100./,PKHSM/1./
      DATA PSAR/.5919/,PSAO/.9358/,PSSM/.382/
C-  #3 -----------------------------------------------------------------
      DATA ACR/100./,X1NPAS/1./
      DATA ACR1/100./,NSRT/20/,XNPASS/1./,NS/4/
      DATA ACR2/29.50/,TOTSR/1103.24/,TOTACK/1038.96/,TOTACL/64.51/
```

```
      DATA TCTACR/5.99/,BLTCGW/28945.09/,TOGW/28945.09/
C- #5 ------------------------------------------------------------------
      DATA N/O/
C***********************************************************************
C     MAIN MENU DISPLAY
C***********************************************************************
100       CCNTINUE
1         CCNTINUE
        CALL FRTCMS('CLRSCRN ')
      WRITE(4,1001)
1001  FORMAT('1','SUPPCRT MENU (1) SELECT A CODE AS FOLLOWS:'//
     +T6,'FCR AN EXPLANATICN                 ',T51,'HP'/
     +T6,'AIRCRAFT CESIGN SELECTION          ',T51,'CE'/
     +T6,'CCMBAT SCENARIO SELECTION          ',T51,'MS'/
     +T6,'SUSCEPTIBILITY ASSESSMENT          ',T51,'SA'/
     +T6,'VULNERABILITY ASSESSMENT           ',T51,'VA'/
     +T6,'SURVIVABILITY ASSESSMENT           ',T51,'SV'/
     +T6,'TC TRANSFER TO OTHER MENUS         ',T51,'TN'/
     +T6,'TC EXIT CR PRINT RESULTS           ',T51,'EX'/)
      READ(5,2000) K1C
2000  FORMAT(A4)
      IF(K1Q.EQ.K1(1)) GC TC 110
      IF(K1C.EC.K1(2)) GO TO 120
      IF(K1Q.EQ.K1(3)) GC TO 130
      IF(K1C.EQ.K1(4)) GC TC 140
      IF(K1Q.EC.K1(5)) GO TO 150
      IF(K1C.EQ.KK(1)) GO TC 9971
      IF(K1Q.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------------
      IF(K1Q.FQ.KK(3)) GC TC 1061
      WRITE(4,1200)
1200  FORMAT(' ','INPUT ERRCR. REPEAT INPUT')
      GO TO 1
C***********************************************************************
C     MENU 2  DESIGN
C***********************************************************************
110     CALL FRTCMS('CLRSCRN ')
2         CCNTINUE
       WRITE(4,1110)
1110  FORMAT('1','MENU (2) DESIGN,  ENTER  A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION                 ',T51,'HP'/
     +T6,'A/C PERFCRMANCE INCICATORS         ',T51,'AP'/
     +T6,'SUSCEPTIBILITY FEATURES            ',T51,'SF'/
     +T6,'VULNERABILITY FEATURES             ',T51,'VF'/
     +T6,'TO RETURN TC MENU (1)              ',T51,'RT'/
     +T6,'TC TRANSFER TO OTHER MENUS         ',T51,'TN'/)
      READ(5,2000) K2Q
      IF(K2C.EQ.K2(1)) GC TC 210
```

```
      IF(K2Q.EQ.K2(2)) GO TO 220
      IF(K2Q.EQ.K2(3)) GO TO 230
      IF(K2Q.EQ.KK(1)) GO TO 9972
      IF(K2Q.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------------
      IF(K2Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 2
C*********************************************************************
C     MENU 3  COMBAT SCENARIO
C*********************************************************************
120      CALL FRTCMS('CLRSCRN ')
3          CONTINUE
       WRITE(4,1120)
1120  FORMAT('1','MENU (3) COMBAT SCENARIO, ENTER  A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION                ',T51,'HP'/
     +T6,'MISSION PROFILE                   ',T51,'MP'/
     +T6,'THREAT SELECTION                  ',T51,'TH'/
     +T6,'TO RETURN TO MENU (1)             ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS        ',T51,'TN'/)
      READ(5,2000) K3Q
      IF(K3Q.EQ.K3(1)) GO TO 310
      IF(K3Q.EQ.K3(2)) GO TO 320
      IF(K3Q.EQ.KK(1)) GO TO 9973
      IF(K3Q.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------------
      IF(K3Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 3
C*********************************************************************
C     MENU 4 SUSCEPTIBILITY ASSESMENT
C*********************************************************************
130      CALL FRTCMS('CLRSCRN ')
4          CONTINUE
       WRITE(4,1130)
1130  FORMAT('1','MENU (4) SUSCEPTIBILITY ASSESSMENT,'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION                ',T51,'HP'/
     +T6,'PROBABILITY OF DETECTION          ',T51,'PD'/
     +T6,'PROBABILITY OF HIT                ',T51,'PH'/
     +T6,'TO RETURN TO MENU (1)             ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS        ',T51,'TN'/)
      READ(5,2000) K4Q
      IF(K4Q.EQ.K4(1)) GO TO 410
      IF(K4Q.EQ.K4(2)) GO TO 420
      IF(K4Q.EQ.KK(1)) GO TO 9974
      IF(K4Q.EQ.KK(2)) GO TO 998
C- #3 ------------------------------------------------------------------
```

```
      IF(K4Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 4
C*************************************************************************
C     MENU 5  VULNERABILITY ASSESMENT
C*************************************************************************
140       CALL FRTCMS('CLRSCRN ')
5           CONTINUE
       WRITE(4,1140)
1140  FORMAT('1','MENU (5) VULNERABILITY ASSESSMENT,'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION               ',T51,'HP'/
     +T6,'VULN AREA / P(K/H) VS AAA        ',T51,'KH'/
     +T6,'VULN AREA / P(K/H) VS SAM        ',T51,'KD'/
     +T6,'TO RETURN TO MENU (1)            ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS       ',T51,'TN'/)
      READ(5,2000,ERR=1061) K5Q
      IF(K5Q.EQ.K5(1)) GO TO 510
      IF(K5Q.EQ.K5(2)) GO TO 520
      IF(K5Q.EQ.KK(1)) GO TO 9975
      IF(K5Q.EQ.KK(2)) GO TO 998
C- #3 ---------------------------------------------------------------------
      IF(K5Q.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 5
C*************************************************************************
C     MENU 6 SURVIVABILITY ASSESMENT
C*************************************************************************
150       CALL FRTCMS('CLRSCRN ')
6           CONTINUE
       WRITE(4,1150)
1150  FORMAT('1','MENU (6) SURVIVABILITY ASSESSMENT,'//
     *T6,'ENTER A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION               ',T51,'HP'/
     +T6,'P(S) 1:1 AAA (RADAR)             ',T51,'AR'/
     +T6,'P(S) 1:1 AAA (OPTICAL)           ',T51,'AO'/
     +T6,'P(S) 1:1 LOW ALT SAM             ',T51,'LS'/
     +T6,'SINGLE SORTIE                    ',T51,'SS'/
     +T6,'CAMPAIGN EVALUATION              ',T51,'CE'/
     +T6,'TO RETURN TO MENU (1)            ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS       ',T51,'TN'/)
      READ(5,2000,ERR=1061) K6Q
      IF(K6Q.EQ.K6(1)) GO TO 610
      IF(K6Q.EQ.K6(2)) GO TO 620
      IF(K6Q.EQ.K6(3)) GO TO 630
      IF(K6Q.EQ.K6(4)) GO TO 640
      IF(K6Q.EQ.K6(5)) GO TO 650
      IF(K6Q.EQ.KK(1)) GO TO 9978
```

```
      IF(K6C.EQ.KK(2)) GC TC 998
C-  #3 ------------------------------------------------------------
      IF(K6C.EQ.KK(4)) GO TO 7
      WRITE(4,1200)
      GO TO 6
C
C-  #3 ------------------------------------------------------------
C*****************************************************************
C**   MENU 7   REASSESSMENT                                     **
C*****************************************************************
   7  CONTINUE
      CALL SRPDSM(JAM,IRCS,PDSM)
      CALL SRPHR(TW,WS,PHR)
      CALL SRPHC(TW,PHC)
      CALL SRPHSM(IWARN,ICHAFF,TW,WS,PHSM)
      CALL SRVAAA(IFS,IFV,IFE,IEA,IEP,ICS,ICA,TW,WS,XMR,XMA,XMT,WT,
     *            VAAAA,PKHAAA)
      CALL SRVASM(IFS,IFV,VASM,PKHSM)
C
C
      PSAR = 1. - PDAR * PHR * PKHAAA
      PSAO = 1. - PDAC * PHC * PKHAAA
      PSSM = 1. - PDSM * PHSM * PKHSM
C
      CALL CAMP(XMR,AAAH,ARC,PKHAAA,PSAR,XMR,AAAH,AOD,PKHAAA,PSAO,
     *      XMR,SAMH,SAMD,PKHSM,PSSM,ACR1,NSRT,XNPASS,NS,
     *          ACR2,TOTSR,TCTACK,TOTACL,TCTACR)
C
      GO TO 1
C
C
C-  #5 ------------------------------------------------------------
C*****************************************************************
C**   MENU (8)    ROUTINE TC GENERATE P(K) VALUES FOR PLOTTING    **
C*****************************************************************
    8 CONTINUE
      IF(N.GE.3) GC TC 999
      CALL FRTCMS('CLRSCRN ')
      WRITE(4,801)N
 801  FORMAT('1',' MENU(8) GRAPH CHOICES'//
     *      T6,'DC YOU WISH TO SAVE P(K) FOR THIS DESIGN?'/
     *      T6,'NCTE:  YOU HAVE ALREADY CHOSEN ',I1,' OF THE',
     *        ' 3 POSSIBLE DESIGNS'/T6,'FOR THIS PLOT.'//
     *      T6,'ENTER A CODE AS FOLLOWS:'/
     *      T6,'    TO SAVE P(K)',T51,'Y'/
     *      T6,'    DC NOT SAVE',T51,'N'/
     *      T6,'    FOR FURTHER EXPLANATICN',T51,'HP')
C
```

```
      READ(4,2000)K8Q
         IF(K8Q.EC.JJ(1)) GC TO 81
         IF(K8Q.EC.JJ(2)) GC TO 999
         IF(K8Q.EQ.KK(1)) GC TO 8988
C
      WRITE(4,120C)
      GO TC 8
   81 CONTINUE
         N = N + 1
         PKAR(N) = 1. - PSAR
         PKAC(N) = 1. - PSAC
         PKSM(N) = 1. - PSSM
C
      IF(N.NE.3) GO TO 999
C
      WRITE(9,802)(PKAR(I),PKAO(I),PKSM(I),I=1,3)
  802 FORMAT(F4.2)
      GO TO 999
C*********************************************************************
C     MENU 21 A/C PERFCRMANCE INPUTS
C*********************************************************************
210      CALL FRTCMS('CLRSCRN ')
21         CCNTINUE
       WRITE(4,1210)TW,WS,WT,B,XL,W,EC,ED,EL
1210  FORMAT('1','      MENU (21) ENTER  A CODE AS FOLLOWS:'//
     +T6,'      A/C PERFORMANCE INDICATORS   '/
     +T6,'1    THRUST TC WEIGHT              ',T51,F6.4/
     +T6,'2    WING LOACING                  ',T51,F6.2,' PSF'/
     +T6,'3    CRDNANCE WEIGHT               ',T51,F6.0,' LBS'/
     +T6,'     WING SPAN                     ',T51,F6.2,' FT'/
     +T6,'     FUSELAGE LENGTH               ',T51,F6.2,' FT'/
     +T6,'     FUSELAGE WIDTH                ',T51,F6.2,' FT'/
     +T6,'     ENGINE FACE TC QUARTER CORC',T51,F6.2,' FT'/
     +T6,'     ENGINE CIAMETER               ',T51,F6.2,' FT'/
     +T6,'     ENGINE LENGTH                 ',T51,F6.2,' FT'//
     +T6,'VALUES 1,2 & 3 ARE VARIABLE; TC CHANGE THEM ENTER ITS NUMBER I
     +N'/T6,'I1 FCRMAT. ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
1211  FORMAT(I1)
      IF(I1.EQ.0) GO TO 110
      GO TO (211,212,213),I1
1212  WRITE(4,120C)
      GO TO 210
211        CCNTINUE
           WRITE(4,1201)
1201       FCRMAT('0','       TW RANGE ALLCWED IS .45 TO .65'/
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
```

```
1202      FCRMAT(F8.4)
          TW=V1
          GC TO 210
212       CCNTINUE
          WRITE(4,1203)
1203      FCRMAT('0','        WS RANGE ALLCWED IS 80. TO 100.'/
     +T6,'ENTFR THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          WS=V1
          GC TO 210
213       CCNTINUE
          WRITE(4,1204)
1204      FCRMAT('0','        WT RANGE ALLCWED IS 5000. TO 10000.'/
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
          READ(5,1202)V1
          WT=V1
          GC TO 210
C*************************************************************************
C      MENU 22 SUSCEPTIBILITY FEATURES
C*************************************************************************
220      CALL FRTCMS('CLRSCRN ')
22        CCNTINUE
       WRITE(4,1220)JAM,IRCS,IWARN,ICHAFF
1220   FORMAT('1','      MENU (22) ENTER  A CODE AS FOLLOWS:'//
     +T6,'      SUSCEPTIBILITY REDUCTION FEATURES      '//
     +T6,'1    JAMMER NUMBER              ',T51,I1/
     +T6,'2    RCS REDUCTION LEVEL        ',T51,I1/
     +T6,'3    RADAR WARNING RECEIVER     ',T51,I1/
     +T6,'4    CHAFF DISPENSER            ',T51,I1//
     +T6,'"0" INDICATES NOT INSTALLEC "1" INCICATES INSTALLED'//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
       READ(5,1211)I1
       IF(I1.EQ.0) GO TC 110
       GO TO (221,222,223,224),I1
1229   WRITE(4,120C)
       GO TO 220
221       CCNTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1221)
1221   FORMAT('1','          JAMMERS AVAILABLE          '//
     +T6,'0                         00    ',/
     +T6,'1                         50 WATTS',/
     +T6,'2                        100 WATTS',/
     +T6,'3                        200 WATTS',/
     +T6,'4                        500 WATTS',/
     +T6,'5                       1000 WATTS',//
     +T6,'ENTER THE JAMMER NUMBER IN I1 FCRMAT')
```

```
      READ(5,1211)I1
      JAM=I1
      GO TO 220
222   CONTINUE
     CALL FRTCMS('CLRSCRN ')
      WRITE(4,1222)
1222  FORMAT('0','          RCS REDUCTION LEVELS              '//
     +T6,'0                     NO REDUCTION   ',/
     +T6,'1                     PROCEDURE 1',/
     +T6,'2                     PROCEDURE 1 & 2',/
     +T6,'3                     PROCEDURE 1,2,3,4,& 5',//
     +T6,'ENTER THE DESIRED RCS LEVEL IN I1 FORMAT')
      READ(5,1211)I1
      IRCS=I1
      GO TO 220
223   CONTINUE
      WRITE(4,1223)
1223  FORMAT(' ','          RADAR WARNING RECEIVER            '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      IWARN=I1
      GO TO 220
224   CONTINUE
      WRITE(4,1224)
1224  FORMAT(' ','          CHAFF DISPENSER                   '//
     +T6,'"0" INDICATES NOT INSTALLED, "1" INDICATES INSTALLED'/
     +T6,'ENTER "0" OR "1" IN I1 FORMAT')
      READ(5,1211)I1
      ICHAFF=I1
      GO TO 220
C*************************************************************************
C      MENU 23  VULNERABILITY FEATURES
C*************************************************************************
230    CALL FRTCMS('CLRSCRN ')
23     CONTINUE
     WRITE(4,1230)IFS,IFV,IFE,IEA,IEP,ICS,ICA
1230 FORMAT('1','        MENU (23) ENTER  A CODE AS FOLLOWS:'//
     +T6,'     VULNERABILITY  REDUCTION FEATURES   '//
     +T6,'1   FUEL SYSTEM GENERAL      ',T51,I1/
     +T6,'2   FUEL/VOID INTERFACE      ',T51,I1/
     +T6,'3   FUEL/ENGINE INTERFACE    ',T51,I1/
     +T6,'4   ENGINE ARRANGEMENT       ',T51,I1/
     +T6,'5   ENGINE PROTECTION        ',T51,I1/
     +T6,'6   CONTROL SYSTEM           ',T51,I1/
     +T6,'7   CREW ARRANGMENT          ',T51,I1//
     +T6,'"1" MINIMUM PROTECTION '/
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT'//
```

```
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 110
      GO TO (231,232,233,234,235,236,237),I1
1239  WRITE(4,1200)
      GO TO 230
231       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1231)
1231  FORMAT('1','          FUEL SYSTEM, GENERAL         '//
     +T6,'1     SINGLE SUMP TANK, NO SELF-SEALING  ',/
     +T6,'2     SINGLE SUMP TANK, WITH SELF-SEALING',/
     +T6,'3     DUAL SUMP TANKS , NO SELF-SEALING    ,   NO SEPARATION',/
     +T6,'4     DUAL SUMP TANKS , WITH SELF-SEALING ,   NO SEPARATION',/
     +T6,'5     DUAL SUMP TANKS , EXTRA SELF-SEALING,   NO SEPARATION',/
     +T6,'6     DUAL SUMP TANKS , NO SELF-SEALING    , WITH SEPARATION',/
     +T6,'7     DUAL SUMP TANKS , WITH SELF-SEALING , WITH SEPARATION',/
     +T6,'8     DUAL SUMP TANKS , EXTRA SELF-SEALING, WITH SEPARATION',//
     +T6,'ENTER THE PROTECTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          IFS=I1
          GO TO 230
232       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1232)
1232  FORMAT('1','          FUEL/VOID INTERFACE         '//
     +T6,'1     TANKS ADJACENT TO DRY BAYS, HIGH SURFACE TEMP',/
     +T6,'2     TANKS ADJACENT TO DRY BAYS WITH ELECTRICAL EQUIPMENT',/
     +T6,'3     TANKS ADJACENT TO DRY BAYS WITH INERTING EQUIPMENT   ',/
     +T6,'4     INTERNAL FOAM OR INERTING FOR TANK ULLAGES           ',/
     +T6,'5     EXTERNAL FOAM OR FIRE EXTINGUISHING FOR VOIDS        ',/
     +T6,'6     BOTH INTERNAL AND EXTERNAL PROTECTION 2 OR 4 & 3 OR 5',//
     +T6,'ENTER THE DESIRED PROTECTION LEVEL IN I1 FORMAT')
          READ(5,1211)I1
          IFV=I1
          GO TO 230
233       CONTINUE
         CALL FRTCMS('CLRSCRN ')
          WRITE(4,1233)
1233  FORMAT('1','          FUEL/ENGINE INTERFACE       '//
     +T6,'1     FUEL AROUND ENGINE                  ',/
     +T6,'2     FUEL AROUND ENGINE WITH PROTECTION  ',/
     +T6,'3     FUEL AROUND DUCTS                   ',/
     +T6,'4     FUEL AROUND DUCTS WITH PROTECTION   ',/
     +T6,'5     DUCTS AROUND FUEL                   ',/
     +T6,'6     DUCTS AROUND FUEL WITH PROTECTION   ',/
     +T6,'7     FUEL FORWARD OF ENGINE              ',/
     +T6,'8     POSITIVE FUEL/ENGINE SEPARATION     ',//
```

```
     +T6,'ENTER THE PROTECTION NUMBER IN I1 FORMAT')
        READ(5,1211)I1
        IFE=I1
        GO TO 230
234     CONTINUE
      CALL FRTCMS('CLRSCRN ')
        WRITE(4,1234)
1234  FORMAT('1','             ENGINE ARRANGEMENT         '//
     +T6,'1   ONE ENGINE, OR TWO ENGINES SEPARATED BY LESS THAN 2 FT',/
     +T6,'2   TWO ENGINES SEPARATED OVER 2 FT             ',//
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
        READ(5,1211)I1
        IEA=I1
        GO TO 230
235     CONTINUE
      CALL FRTCMS('CLRSCRN ')
        WRITE(4,1235)
1235  FORMAT('1','             ENGINE PROTECTION          '//
     +T6,'1   NONE                                         ',/
     +T6,'2   WITH PROTECTION AND/OR OVER 6 FT OF SEPARATION',//
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
        READ(5,1211)I1
        IEP=I1
        GO TO 230
236     CONTINUE
      CALL FRTCMS('CLRSCRN ')
        WRITE(4,1236)
1236  FORMAT('1','             CONTROL SYSTEM             '//
     +T6,'1    NO BACKUP - OVER 5 SINGLE POINT FAILURE (SPF) SITES',/
     +T6,'2    NO BACKUP - UNDER 5 SPF SITES',/
     +T6,'3    WITH BACKUP - OVER 5 SPF SITES    ',/
     +T6,'4    WITH BACKUP - UNDER 5 SPF SITES   ',/
     +T6,'5    NO SINGLE POINT FAILURE SITES ',/
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
        READ(5,1211)I1
        ICS=I1
        GO TO 230
237     CONTINUE
      CALL FRTCMS('CLRSCRN ')
        WRITE(4,1237)
1237  FORMAT('1','             CREW ARRANGEMENT           '//
     +T6,'1    NO BOTTOM SHIELD FOR PILOT BY ARMOR OR EQUIPMENT',/
     +T6,'2    NO SIDE SHIELD FOR PILOT BY ARMOR OR EQUIPMENT',/
     +T6,'3    PARTIAL ARMOR PROTECTION WITH STANDOFF(FRONT AND/OR BOTTO
     &M)',/
     +T6,'4    PARTIAL ARMOR PROTECTION WITH NO STANDOFF(FRONT AND/OR BO
     &TTOM)',/
     +T6,'5    FULL ARMOR PROTECTION WITH STANDOFF (FRONT,BOTTOM, AND SI
```

```
      &DES)',/
     +T6,'6    FULL ARMOR PROTECTION WITH NO STANDOFF (FRONT,BOTTOM AND
     &SIDES)',//
     +T6,'ENTER THE DESCRIPTION NUMBER IN I1 FORMAT')
          READ(5,1211)I1
          ICA=I1
          GO TO 230
C*********************************************************************
C     MENU 31  MISSION DESCRIPTION
C*********************************************************************
310        CALL FRTCMS('CLRSCRN ')
31          CONTINUE
       WRITE(4,1310)XMR,XMA,XMT
1310   FORMAT('1','      MENU (31)                         '//
     +T6,'      MISSION DESCRIPTION          '//
     +T6,'1   MISSION RADIUS OF ACTION',T51,F6.0,' MI.'/
     +T6,'2   MISSION LOITER ALTITUDE ',T51,F6.0,' FT'/
     +T6,'3   MISSION TIME ON STATION ',T51,F6.0,' MINUTES'//
     +T6,'TO CHANGE THEM ENTER ITS NUMBER IN I1 FORMAT.'//
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
       READ(5,1211)I1
       IF(I1.EQ.0) GO TO 120
       GO TO (311,312,313),I1
1319   WRITE(4,1200)
       GO TO 310
311         CONTINUE
            WRITE(4,1311)
1311        FORMAT('0','        MISSION RADIUS RANGE 200. TO 300. NM'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            XMR=V1
            GO TO 310
312         CONTINUE
            WRITE(4,1312)
1312        FORMAT('0','        LOITER ALTITUDE RANGE 1. TO 10000. FT'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            XMA=V1
            GO TO 310
313         CONTINUE
            WRITE(4,1313)
1313        FORMAT('0','        TIME ON STATION RANGE 60. TO 120. MIN.'//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            XMT=V1
            GO TO 310
C*********************************************************************
C     MENU 32  THREAT DEFINITION
```

```
+T6,'      THE PROBABILITY OF HIT IS DEFINED SEPARATELY FOR EACH'/
+T6,' AIRCRAFT AND THREAT. HOWEVER, THE FORM IS CONSISTENT, WHERE'/
+T6,' P(H) REFERS TO THE PROBABILITY THAT A NON-MANEUVERING A/C'/
+T6,' WOULD BE HIT BY THE THREAT, F(M) IS THE MANEUVER FACTOR.'/
+T6,' AND F(C) IS THE COUNTERMEASURE (CHAFF OR FLARE) FACTOR.'//
+T6,'              P(H)'' = P(H) * F(M) * F(C)             '//
+T6,'          ENTER ANY INTEGER TO RETURN TO MENU 4             ')
      READ(5,*)IJK
      GO TO 130
9975    CALL FRTCMS('CLRSCRN ')
      WRITE(4,7975)
7975  FORMAT(' ','                          HELP FOR MENU 5         '/
+T6,'        THE VULNERABILITY ASSESSMENT SECTION CALCULATES  '/
+T6,' EITHER THE P(K/H) OR THE AVERAGE VULNERABLE AREA FOR THE '/
+T6,' AIRCRAFT VERSUS A THREAT. FOR THE SUPPORT AIRCRAFT;   '//
+T6,'   VS AAA                                                 '/
+T6,'      AV  = REGRESSION FORMULA THAT IS A FUNCTION   '/
+T6,'            OF VULNERABILITY FEATURE INPUTS          '/
+T6,'      P(K/H) = 1- EXP (-1*AV/125.)'/
+T6,'   VS SAM                                                 '/
+T6,'      P(K/H) = FROM TABLE BASED UPON VULN. FEATURES   '/
+T6,'      AV  = 100. * EXP ( PKH - 1.)'/
+T6,'          ENTER ANY INTEGER TO RETURN TO MENU 5             ')
      READ(5,*)IJK
      GO TO 140
9976    CALL FRTCMS('CLRSCRN ')
      WRITE(4,7976)
7976  FORMAT(' ','                          HELP FOR MENU 41        '/
+T6,'        THE FOLLOWING METHODS ARE USED FOR THE SUPPORT P(D)'//
+T6,'   VS A/A GUNS/MISSILE                                    '/
+T6,'      P(D) = 1.                                       '/
+T6,'   VS SAM                                                 '/
+T6,'      P(D) = TWO TIMES THE INTEGRAL OF THE GAUSSIAN       '/
+T6,'                PROBABILITY FUNCTION FROM INFINITY TO CPA'//
+T6,'          ENTER ANY INTEGER TO RETURN TO MENU 41            ')
      READ(5,*)IJK
      GO TO 410
9977    CALL FRTCMS('CLRSCRN ')
      WRITE(4,7977)
7977  FORMAT(' ','                          HELP FOR MENU 42        '/
+T6,'        THE FOLLOWING METHODS ARE USED FOR THE SUPPORT P(H)'/
+T6,'PH = PROBABILITY THAT A NON-MANEUVERING A/C IS HIT      '/
+T6,'FA = PROBABILITY THAT THE CREW IS ALLERTED AND TAKES EVASIVE
+ACTION.'/
+T6,'FM = MANEUVER FACTOR          FC = CHAFF FACTOR'/
+T6,'WS = WING LOADING/100.        TW = THRUST TO WEIGH'//
+T6,'   VS AAA (OPTICAL)                                       '/
+T6,'        PH= .1456                     FA= 1.'/
```

```
      WRITE(4,7972)
7972  FORMAT(' ','                         HELP FOR MENU 2            '/
     +T6,' THE DESIGN SECTION IS DIVIDED INTO THREE SUBSECTIONS.'/
     +T6,'      THE AIRCRAFT PERFORMANCE INDICATORS AFFECT THE '/
     +T6,' ABILITY OF THE AIRCRAFT TC MANEUVER AND AVOID THE THREAT.'/
     +T6,' SOME OF THE VALUES MAY REMOVE THE AIRCRAFT FROM THE'/
     +T6,' THREAT ENVELOPE COMPLETELY. A FURTHER DISCUSSION OF THE '/
     +T6,' IMPACT OF THESE VALUES MAY BE FOUND IN THE P(H) SECTION'/
     +T6,' OF SUSCEPTIBILITY EVALUATION.                 '/
     +T6,'      SUSCEPTIBILITY REDUCTION FEATURES OF THE DESIGN ARE'/
     +T6,' ENTERED IN THIS SECTION. THESE INCLUDE JAMMER SIZE, RCS '/
     +T6,' REDUCTION LEVELS, CHAFF DISPENSER AND RADAR WARNING RE- '/
     +T6,' CEIVER. THE DEFAULT VALUES (BASELINE) ARE ZERO, INDICATING'/
     +T6,' NONE OF THESE FEATURES ARE INCLUDED.                       '/
     +T6,'      VULNERABILITY REDUCTION FEATURES VARY WITH THE THREE'/
     +T6,' TYPES OF AIRCRAFT. SELECT THOSE FEATURES THAT BEST'/
     +T6,' DESCRIBE YOUR DESIGN. MINIMUM VALUES OF 1 (BASELINE)'/
     +T6,' INDICATE NO IMPROVEMENTS.                                 '//
     +T6,'          ENTER ANY INTEGER TO RETURN TO MENU 2            ')
      READ(5,*)IJK
      GO TO 110
9973     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7973)
7973  FORMAT(' ','                         HELP FOR MENU 3            '/
     +T6,' THE COMBAT SCENERIO SECTION IS DIVIDED INTO TWO SUBSECTIONS.
     +'/,T6,'        IN MISSION PROFILE, VALUES ARE ENTERED TO SPECIFICALLY
     +',T6,' DEFINE THE DESIRED MISSION. THE MISSION PARAMETERS ARE DEFI
     +NED'/,T6,' BY THE SELECTION OF AIRCRAFT TYPE. THESE INCLUDE ITEMS'
     +/,T6,' THAT MIGHT BE CONSIDED TACTICS.                        '/
     +T6,'      IN THREAT SELECTION, THREAT DENSITIES AND THREAT'/
     +T6,' DIAMETERS ARE ENTERED.  THE THREATS FOR THE CLOSE AIR'/
C- #2 -------------------------------------------------------------------
     +T6,' SUPPORT MISSION ARE; AAA (OPTICLE), AAA (RADAR), AND'/
     +T6,' LOW ALTITUDE SAM''S.'//
     +T6,'         ENTER ANY INTEGER TO RETURN TO MENU 3            ')
      READ(5,*)IJK
      GO TO 120
9974     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7974)
7974  FORMAT(' ','                         HELP FOR MENU 4            '/
     +T6,' THE SUSCEPTIBILITY ASSESSMENT SECTION HAS TWO SUBSECTIONS.'/
     +T6,'      THE PROBABILITY OF DETECTION IS AFFECTED BY THE'/
     +T6,' RCS OF THE AIRCRAFT, THE POWER OF THE NOISE JAMMER, '/
     +T6,' AND THE SLANT RANGE FROM THE THREAT TO THE A/C AT CPA.'/
     +T6,' NOTE THAT ALL AIRCRAFT ARE CONSIDERED TO PASS OVER A POINT'/
     +T6,' THAT IS THE SAME HORIZONTAL DISTANCE FROM THE THREAT '/
     +T6,' AS THE ALTITUDE OF THE AIRCRAFT. THIS MEANS THAT THE'/
     +T6,' CPA SLANT RANGE IS 1.414 TIMES THE ALTITUDE.'/
```

```
      WRITE(4,1656)
1656      FCRMAT('0',T6,'ENTER MAX NUMBER CF SCRTIES FOR REPAIR IN I2 FC
     +RMAT.')
          READ(5,1697)I2
          NS=I2
          GC TO 659
699   CONTINUE
      ARD= AAAD/FLCAT(JAM+1)
      AOD= AAAD-ARC
      CALL CAMP(XMR,AAAH,ARC,PKHAAA,FSAR,
     &XMR,AAAH,AOC,PKHAAA,PSAO,XMR,SAMH,SAMD,PKHSM,PSSM,
     & ACR1,NSRT,XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
         CALL FRTCMS('CLRSCRN ')
       WRITE(4,1699)ACR2,TCTSR,TOTACK,TOTACL,TOTACR
1699  FORMAT('1','      RESULTS OF THE CAMPAIGN AGAINST THE THREATS'//
     +T6,'     UNDAMAGEC AIRCRAFT         ',T51,F6.0/
     +T6,'     SORTIES FLOWN              ',T51,F8.0/
     +T6,'     TARGETS ATTACKED           ',T51,F8.0/
     +T6,'     AIRCRAFT LOST              ',T51,F6.0/
     +T6,'     AIRCRAFT DAMAGED           ',T51,F6.0//
     +T6,'TO RERUN A CAMPAIGN ENTER 1 '/
     +T6,'TO RETURN TO MENU (6) ENTER 0')
      READ(5,1211)I1
       IF(I1.EQ.1) GO TO 650
       GO TC 150
C*****************************************************************
C     HELP
C*****************************************************************
9971     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7971)
7971  FORMAT(' ','                      HELP FCR MENU 1            '/
     +T6,' THE VISAP DESIGN EVALUATOR IS CIVICED INTO FIVE SECTIONS. '/
     +T6,'      THE AIRCRAFT CESIGN SECTICN IS WHERE A DESCRIPTION OF'/
     +T6,' THE AIRCRAFT IS ENTERED. THIS INCLUDES GENERAL PARAMETRIC'/
     +T6,' SIZING VALUES AS WELL AS DESCRIPTICNS OF THE S/V FEATURES'/
     +T6,' CONTAINED IN THE DESIGN. VALUES SHCWN INITIALLY ARE DEFAULT'/
     +T6,' VALUES WHICH MAY BE CHANGED.'/
     +T6,'      THE MISSICN SECTION IS WHERE THE MISSION PARAMETERS AND'/
     +T6,' THREAT INTENSITY VALUES ARE ENTEREC. NOTE THAT THE TYPE'/
     +T6,' OF THREATS CANNOT BE CHANGED BECAUSE THE SELECTION OF THE'/
     +T6,' AIRCRAFT DETERMINES THE THREATS.                       '/
     +T6,'      THE LAST THREE SECTICNS ARE FOR EVALUATION OF THE'/
     +T6,' DESIGN. IF THE DESIGN AND THREAT SECTIONS ARE NOT ENTERED'/
     +T6,' DEFAULT VALUES (BASELINE) WILL BE USED FOR ALL CALCULATIONS.'
     +,//T6,'           ENTER ANY INTEGER TC RETURN TO MENU 1      ')
      READ(5,*)IJK
      GO TO 100
9972     CALL FRTCMS('CLRSCRN ')
```

```
     +T6,'TO RETURN TO MENU (6) ENTER O')
      READ(5,1211)I1
       IF(I1.EQ.1) GO TO 640
       GO TO 150
C*****************************************************************
C     MENU 63  CAMPAIGN ANALYSIS
C*****************************************************************
650       CONTINUE
659        CONTINUE
          CALL FRTCMS('CLRSCRN ')
       WRITE(4,1650)ACR1,NSRT,XNPASS,NS,PSAR,PSAO,PSSM
1650  FORMAT('1',' MENU (63)  CAMPAIGN ANALYSIS '//
     +T6,'1    AIRCRAFT IN CAMPAIGN            ',T46,F6.0/
     +T6,'2    NUMBER OF RAIDS IN CAMPAIGN     ',T43,I6/
     +T6,'3    NUMBER OF PASSES PER SORTIE     ',T44,F6.0/
     +T6,'4    NUMBER OF SORTIES FOR REPAIR    ',T43,I6//
     +T6,'5    P(S) VS AAA(RADAR)              ',T48,F6.4/
     +T6,'6    P(S) VS AAA(OPTICAL)            ',T48,F6.4/
     +T6,'7    P(S) VS LOW ALT SAM             ',T48,F6.4//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'/
     +T6,'ENTER O FOR NO CHANGE REQUIRED')
      READ(5,1659)I1
1659  FORMAT(I1)
      IF(I1.EQ.0) GO TO 699
      GO TO (651,652,653,656,618,628,638),I1
1658  WRITE(4,1200)
           GO TO 650
651        CONTINUE
           WRITE(4,1651)
1651       FORMAT('0',T6,'ENTER NUMBER OF A/C IN REAL NUMBER FORMAT.')
           READ(5,1657)V1
1657       FORMAT(F8.4)
           ACR1=V1
           GO TO 659
652        CONTINUE
           WRITE(4,1652)
1652       FORMAT('0',T6,'ENTER NUMBER OF RAIDS IN I2 FORMAT.')
           READ(5,1697)I2
1697       FORMAT(I2)
           NSRT=I2
           GO TO 659
653        CONTINUE
           WRITE(4,1653)
1653    FORMAT('0',T6,'ENTER PASSES PER SORTIE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           XNPASS=V1
           GO TO 659
656        CONTINUE
```

```
      WRITE(4,1611)
      READ(5,1657)PDSM,PHSM,PKHSM
      PSSM=1.-PDSM * PHSM * PKHSM
      GO TO 638
C*************************************************************************
C     MENU 62  SORTIE ANALYSIS
C*************************************************************************
640     CONTINUE
649     CALL FRTCMS('CLRSCRN ')
     WRITE(4,1640)ACR,X1NPAS,PSAR,PSAO,PSSM
1640  FORMAT('1',' MENU (62)  SORTIE ANALYSIS     '//
    +T6,'1   AIRCRAFT IN SORTIE               ',T46,F6.0/
    +T6,'2   NUMBER OF PASSES PER SORTIE  ',T44,F6.0/
    +T6,'3   P(S) VS AAA (RADAR)          ',T48,F6.4/
    +T6,'4   P(S) VS AAA (OPTICAL)        ',T48,F6.4/
    +T6,'5   P(S) VS LOW ALT SAM          ',T48,F6.4//
    +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'/
    +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
     READ(5,1659)I1
     IF(I1.EQ.0) GO TO 689
     GO TO (641,642,618,628,638),I1
1648  WRITE(4,1200)
        GO TO 640
641     CONTINUE
        WRITE(4,1651)
        READ(5,1657)V1
        ACR=V1
        GO TO 649
642     CONTINUE
        WRITE(4,1653)
        READ(5,1202)V1
        X1NPAS=V1
        GO TO 649
689   CONTINUE
      ARD= AAAD/FLOAT(JAM+1)
      AOD= AAAD-ARD
      CALL SCRT(XMR,AAAH,ARD,PKHAAA,PSAR,
    &XMR,AAAH,AOD,PKHAAA,PSAO,XMR,SAMH,SAMD,PKHSM,PSSM,
    & ACR,1,X1NPAS,4,ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
        CALL FRTCMS('CLRSCRN ')
     WRITE(4,1689)ACR2,TOTSR,TOTACK,TOTACL,TOTACR
1689  FORMAT('1','     RESULTS FROM SINGLE SORTIE AGAINST THE THREATS'//
    +T6,'     UNDAMAGED AIRCRAFT        ',T51,F6.2/
    +T6,'     SORTIES FLOWN             ',T51,F6.2/
    +T6,'     TARGETS ATTACKED          ',T51,F6.2/
    +T6,'     AIRCRAFT LOST             ',T51,F6.2/
    +T6,'     AIRCRAFT DAMAGED          ',T51,F6.2//
    +T6,'TO RERUN A SORTIE ANALYSIS ENTER "1"'/
```

```
      GC TO 618
611   CCNTINUE
      WRITE(4,1611)
1611  FORMAT('0',T6,'ENTER P(D),P(H), P(K/H) IN REAL NUMBER FCRTMAT'/
     +T6,'                (RANGE 0.001 TO 1.00)')
      READ(5,1657)PDAR,PHR,PKHAA
      PSAR=1.- PDAR * PHR * PKHAA
      GO TO 618
C****************************************************************
C     P(S) AAA OPTICAL
C****************************************************************
620   PSAO = 1.- PDAO * PHO * PKHAAA
628   CALL FRTCMS('CLRSCRN ')
     WRITE(4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IEP,ICS,ICA
      WRITE(4,1620)PSAO,PCAO,PHO,PKHAAA
1620  FORMAT('0',T6,' THE PROB OF SURVIVAL VS AAA(OPTICAL)'//
     +T6,'   PS   =  1  -   PD   *   PH   *   PK/H '/
     +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
     +T6,'TC CHANGE THIS VALUE ENTER 1 IN I1 FORMAT'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
     READ(5,1659)I1
     IF(I1.EQ.0) GO TC 150
     GO TO (621,1629),I1
1629 WRITE(4,1200)
      GO TO 628
621   CCNTINUE
      WRITE(4,1611)
      READ(5,1657)PDAO,PHO,PKHAA
      PSAO=1.-PDAC * PHC * PKHAA
      GC TO 628
C****************************************************************
C     P(S) LOW ALT SAM
C****************************************************************
630   PSSM = 1.- PDSM * PHSM * PKHSM
638   CALL FRTCMS('CLRSCRN ')
     WRITE(4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IEP,ICS,ICA
      WRITE(4,1630)PSSM,PCSM,PHSM,PKHSM
1630  FORMAT('0',T6,' THE PROB OF SURVIVAL VS SAM'//
     +T6,'   PS   =  1  -   PD   *   PH   *   PK/H '/
     +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
     +T6,'TC CHANGE THIS VALUE ENTER 1 IN I1 FORMAT'/
     +T6,'ENTER 0 FCR NO CHANGE REQUIRED')
     READ(5,1659)I1
     IF(I1.EQ.0) GO TO 150
     GO TO (631,1639),I1
1639 WRITE(4,120C)
      GO TO 638
631   CCNTINUE
```

```
1521      CALL FRTCMS('CLRSCRN ')
           WRITE(4,1522)VASM,PKHSM
1522    FORMAT('1',T6,' THE COMPUTED A(V) VS SAM IS ',T51,F6.0,' SQFT'/
     +T6,'THE P(K/H) IS ',T51,F6.4,//
     +T6,'TO CHANGE THESE VALUES ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 140
        IF(I1.EQ.1) GO TO 1523
1524    WRITE(4,1200)
        GO TO 1521
1523       CONTINUE
           WRITE(4,1525)
1525       FORMAT('0','        VULN  AREA   RANGE   37.0 TO 100.0     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           VASM=V1
           PKHSM = 1. + ALOG(VASM/100.)
           GO TO 1521
C*********************************************************************
C      MENU 61  P(S) AAA RADAR
C*********************************************************************
610       PSAR = 1.- PDAR * PHR * PKHAAA
618       CALL FRTCMS('CLRSCRN ')
        WRITE(4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IEP,ICS,ICA
2220   FORMAT('0','* SUSCEPTIBILITY REDUCTION FEATURES ',
     +T40,' * VULNERABILITY  REDUCTION FEATURES   '//
     +,'       JAMMER NUMBER              ',T35,I1,
     +T42,'     FUEL SYSTEM GENERAL       ',T69,I1/
     +,'       RCS REDUCTION LEVEL        ',T35,I1,
     +T42,'     FUEL/VOID INTERFACE       ',T69,I1/
     +,'       RADAR WARNING RECEIVER     ',T35,I1,
     +T42,'     FUEL/ENGINE INTERFACE     ',T69,I1/
     +,'       CHAFF DISPENSER            ',T35,I1,
     +T42,'     ENGINE ARRANGEMENT        ',T69,I1/
     +T42,'     ENGINE PROTECTION         ',T69,I1/
     +T42,'     CONTROL SYSTEM            ',T69,I1/
     +T42,'     CREW ARRANGMENT           ',T69,I1/)
          WRITE(4,1610)PSAR,PDAR,PHR,PKHAAA
1610      FORMAT('0',T6,' THE PROB OF SURVIVAL VS AAA(RADAR)'//
     +T6,'    PS    =   1   -    PD    *    PH    *    PK/H '/
     +T9,F6.4,7X,F6.4,3X,F6.4,3X,F6.4//
     +T6,'TO CHANGE THIS VALUE ENTER 1 IN I1 FORMAT'/
     +T6,'ENTER 0 FOR NO CHANGE REQUIRED')
       READ(5,1659)I1
       IF(I1.EQ.0) GO TO 150
       GO TO (611,1619),I1
1619   WRITE(4,1200)
```

```
423     CONTINUE
          CALL SRPHSM(IWARN,ICHAFF,TW,WS,PHSM)
1423      CALL FRTCMS('CLRSCRN ')
           WRITE(4,14923)PHSM
14923   FORMAT('1',T6,'THE PROB. OF HIT BY LOW ALT. SAM  IS '
     +,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 420
        IF(I1.EQ.1) GO TO 14232
14933   WRITE(4,1200)
        GO TO 1423
14232      CONTINUE
           WRITE(4,1497)
           READ(5,1202)V1
           PHSM=V1
           GO TO 1423
C*********************************************************************
C      MENU 51  VULN. AREA / P(K/H) VS AAA
C*********************************************************************
510     CONTINUE
         CALL SRVAAA(IFS,IFV,IFE,IEA,IEP,ICS,ICA,TW,WS,XMR,XMA,XMT,WT,VAA
     &AA,PKHAAA)
1511      CALL FRTCMS('CLRSCRN ')
           WRITE(4,1512)VAAAA,PKHAAA
1512    FORMAT('1',T6,'THE COMPUTED A(V) VS AAA IS ',T51,F6.0,' SQFT',/
     +T6,'THE P(K/H) IS ',T51,F6.4,//
     +T6,' TO CHANGE THESE VALUES ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 140
        IF(I1.EQ.1) GO TO 1513
1514    WRITE(4,1200)
        GO TO 1511
1513       CONTINUE
           WRITE(4,1515)
1515       FORMAT('0','        VULN  AREA   RANGE   20.0 TO 100.0    '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           VAAAA=V1
C- #1 ----------------------------------------------------------------
           PKHAAA = 1. - EXP(-1.*VAAAA/125.)
           GO TO 1511
C*********************************************************************
C      VULN. AREA / P(K/H) VS LOW ALT SAM
C*********************************************************************
520        CONTINUE
         CALL SRVASM(IFS,IFV,VASM,PKHSM)
```

```
      IF(K8Q.EQ.KK(4)) GC TC 130
      WRITE(4,1200)
      GO TO 42
C*****************************************************************
C     PROB CF HIT AAA RADAR
C*****************************************************************
421     CONTINUE
          CALL SRPHR(TW,WS,PHR)
1421      CALL FRTCMS('CLRSCRN ')
           WRITE(4,14911)PHR
14911   FORMAT('1',T6,'THE CCMPUTED P(H) BY AAA(RADAR) IS '
     +,F6.4//T6,'TC CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NC CHANGE REQUIREC')
        READ(5,1211)I1
        IF(I1.EQ.0) GC TO 42C
        IF(I1.EQ.1) GO TO 14212
14913   WRITE(4,12CC)
        GO TO 1421
14212      CONTINUE
           WRITE(4,1497)
1497       FORMAT('C','        PH  RANGE    0.0 TC 1.0     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           PHR=V1
           GC TO 1421
C*****************************************************************
C     PROB CF HIT AAA CPTICAL
C*****************************************************************
422     CONTINUE
          CALL SRPHC(TW,PHO)
1422      CALL FRTCMS('CLRSCRN ')
           WRITE(4,14921)PHC
14921   FORMAT('1',T6,'THE CCMPUTED P(H) BY THE AAA(OPTICAL) IS '
     +,F6.4//T6,'TC CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NC CHANGE REQUIREC')
        READ(5,1211)I1
        IF(I1.EQ.0) GO TO 42C
        IF(I1.EQ.1) GO TO 14222
14929   WRITE(4,12C0)
        GO TO 1422
14222      CCNTINUE
           WRITE(4,1497)
           READ(5,1202)V1
           PHC=V1
           GC TO 1422
C*****************************************************************
C     PROB OF HIT LOW ALT SAM
C*****************************************************************
```

```
      IF(I1.EQ.0) GO TC 410
      IF(I1.EQ.1) GO TC 1416
1418  WRITE(4,1200)
      GO TO 412
1416      CCNTINUE
          WRITE(4,1417)
          READ(5,1202)V1
          PCAO=V1
          GC TO 412
C*****************************************************************
C     PD VS SAM
C*****************************************************************
413       CCNTINUE
         CALL SRPCSM (JAM,IRCS,PDSM)
         CALL FRTCMS('CLRSCRN ')
1490   WRITE(4,1491)PDSM
1491  FORMAT('1',T6,'THE COMPUTED P(D) BY LOW ALT. SAM (RADAR) IS '
     +,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER C FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TC 410
      IF(I1.EQ.1) GO TO 1492
1493  WRITE(4,1200)
      GO TO 1490
1492      CCNTINUE
          WRITE(4,1417)
          READ(5,1202)V1
          PCSM=V1
          GC TO 1490
C*****************************************************************
C     MENU 42  PROB OF HIT
C*****************************************************************
420      CALL FRTCMS('CLRSCRN ')
42        CCNTINUE
      WRITE(4,1420)
1420  FORMAT('1','MENU (42) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T51,'HP'/
     +T6,'P(H) VS AAA (RADAR)             ',T51,'AR'/
     +T6,'P(H) VS AAA (OPTICAL)           ',T51,'AO'/
     +T6,'P(H) VS LOW ALT. SAM            ',T51,'LS'/
     +T6,'TO RETURN TO MENU (4)           ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS      ',T51,'TN'/)
      READ(5,2000) K8C
      IF(K8Q.EQ.K6(1)) GO TC 421
      IF(K8C.EQ.K6(2)) GO TO 422
      IF(K8Q.EQ.K6(3)) GC TC 423
      IF(K8C.EQ.KK(1)) GO TO 9977
      IF(K8C.EQ.KK(2)) GC TO 998
```

```
410       CALL FRTCMS('CLRSCRN ')
41         CONTINUE
      WRITE(4,1410)
1410  FORMAT('1','MENU (41) SELECT A CODE AS FOLLOWS:'//
     +T6,'FOR AN EXPLANATION              ',T51,'HP'/
     +T6,'P(D) VS AAA (RADAR)             ',T51,'AR'/
     +T6,'P(D) VS AAA (OPTICAL)           ',T51,'AO'/
     +T6,'P(D) VS LOW ALT. SAM            ',T51,'LS'/
     +T6,'TO RETURN TO MENU (4)           ',T51,'RT'/
     +T6,'TO TRANSFER TO OTHER MENUS      ',T51,'TN'/)
      READ(5,2000) K7Q
      IF(K7Q.EQ.K6(1)) GO TO 411
      IF(K7Q.EQ.K6(2)) GO TO 412
      IF(K7Q.EQ.K6(3)) GO TO 413
      IF(K7Q.EQ.KK(1)) GO TO 9976
      IF(K7Q.EQ.KK(2)) GO TO 998
      IF(K7Q.EQ.KK(4)) GO TO 130
      WRITE(4,1200)
      GO TO 41
C*************************************************************************
C     PD AAA RADAR
C*************************************************************************
411       CALL FRTCMS('CLRSCRN ')
       WRITE(4,1411)PDAR
1411  FORMAT('1',T6,'THE PROBABILITY OF DETECTION BY AAA (RADAR) IS '
     +,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 410
      IF(I1.EQ.1) GO TO 1413
1419  WRITE(4,1200)
      GO TO 411
1413       CONTINUE
           WRITE(4,1417)
1417       FORMAT('0','        PD  RANGE   0.0 TO 1.0     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
           READ(5,1202)V1
           PDAR=V1
           GO TO 411
C*************************************************************************
C     PD AAA OPTICAL
C*************************************************************************
412       CALL FRTCMS('CLRSCRN ')
       WRITE(4,1415)PDAO
1415  FORMAT('1',T6,'THE PROBABILITY OF DETECTION BY AAA (OPTICAL) IS '
     +,F6.4//T6,'TO CHANGE THIS VALUE ENTER 1'/
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
```

```
C*********************************************************************
320       CALL FRTCMS('CLRSCRN ')
32          CCNTINUE
      WRITE(4,1320)AAAH,AAAD,SAMH,SAMD
1320  FORMAT('1','       MENU (32)                              '//
     +T6,'       THREAT DEFINITION                 '//
     +T6,'1    AAA THREAT DENSITY         ',T51,F6.4,' WP/SQ.MI.'/
     +T6,'2    AAA THREAT DIAMETER        ',T51,F6.2,' MI.'//
     +T6,'3    SAM THREAT DENSITY         ',T51,F6.4,' WP/SQ.MI.'/
     +T6,'4    SAM THREAT DIAMETER        ',T51,F6.2,' MI.'//
     +T6,'TO CHANGE A VALUE ENTER ITS NUMBER IN I1 FORMAT.'//
     +T6,' ENTER 0 FOR NO CHANGE REQUIRED')
      READ(5,1211)I1
      IF(I1.EQ.0) GO TO 120
      GO TO (321,322,323,324),I1
1329  WRITE(4,1200)
      GO TO 320
321         CCNTINUE
            WRITE(4,1321)
1321        FORMAT('0','        AAA THREAT DENSITY RANGE 0.0 TO .02     '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            AAAH=V1
            GC TC 320
322         CONTINUE
            WRITE(4,1322)
1322        FORMAT('0','        AAA THREAT DIAMETER RANGE 0.0 TO 5.   '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            AAAD=V1
            GO TO 320
323         CCNTINUE
            WRITE(4,1323)
1323        FCRMAT('0','        SAM THREAT DENSITY RANGE 0.0 TO .002  '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            SAMH=V1
            GC TO 320
324         CCNTINUE
            WRITE(4,1324)
1324        FCRMAT('C','        SAM THREAT DIAMETER RANGE 0.0 TO 25.  '//
     +T6,'ENTER THE NEW VALUE IN REAL NUMBER FORMAT.')
            READ(5,1202)V1
            SAMD=V1
            GC TO 320
C*********************************************************************
C     MENU 41  PRCB OF DETECTION
C*********************************************************************
```

```
     +T6,'        FM= 1 - .05 * TW                              '/
     +T6,'        PH'' = PH * (1. -(1.-FM)*FA)                       '/
     +T6,'    VS AAA (RADAR)                                          '/
     +T6,'        PH= 1.                      FA= 1.'/
     +T6,'        FM= ( 1.-.15 * TW)*( 1. - EXP(-1*(WS-50.)/10.))'/
     +T6,'        PH'' = PH * (1. -(1.-FM)*FA)                       '/
     +T6,'    VS SAM                                                  '/
     +T6,'        PH = .17512        FC = .6                          '/
     +T6,'        FM = 1.-7.80516*TW + 6.166 * WS**8 + .907024 * WS**-4'/
     +T6,'        PH'' = PH * FC * ( 1. - (1.- FM) * FA)              '//
     +T6,'            ENTER ANY INTEGER TO RETURN TO MENU 42          ')
      READ(5,*)IJK
      GO TO 420
9978     CALL FRTCMS('CLRSCRN ')
      WRITE(4,7978)
7978  FORMAT(' ','                          HELP FOR MENU 6           '//
     +T6,'THE P(S) VS INDIVIDUAL WEAPONS                           '/
     +T6,'        P(S) = 1 -  P(D) * P(H) * P(K/H)                  '//
     +T6,'THE P(S) FOR SINGLE SORTIE                         '/
     +T6,'      W = WEIGHTING FACTOR              XL = PENETRATION DISTANCE'/
     +T6,'      XH = THREAT DENSITY                DL = THREAT DIAMETER    '/
     +T6,'      H = A/C HIT      XK = A/C KILLED    A = A/C DAMAGED       '/
     +T6,'      ACOVER = A/C OVER TARGET           ATAC = TARGETS ATTACKED '/
     +T6,'      PSM = PROB. OF MISS. SURVIVAL   ACR1 = A/C IN FORMATION'//
     +T6,'      W = XL * XH * D / 100.          PSM = PS ** W      '/
     +T6,'      PH = (1. - PSM)/PKH              H1 = ACR1 * PH    '/
     +T6,'      XK1 = H * PKH                    A1 = H1 - XK1     '/
     +T6,'      ACOVER = ACR1-H1-H2-H3           ATAC = ACOVER * XNPAS '/
     +T6,'      H4 = ACOVER * PH                 XK4 = H4 * PKH       '/
     +T6,'      A3 = H4 - XK4                    ACNHT = ACR1-H1-H4    '/
     +T6,'      ACDAM = A1 + A4                  ACKIL = XK1 + XK4     '//
     +T6,'            ENTER ANY INTEGER TO RETURN TO MENU 6            ')
      READ(5,*)IJK
C-  #3 -------------------------------------------------------------------
      GO TO 150
C-  #5 -------------------------------------------------------------------
C ****************** PLOTTING INFORMATION ***************************
 8988 CALL FRTCMS('CLRSCRN ')
      WRITE(4,8889)
 8889 FORMAT(' ','             HELP FOR MENU (8)        '//
     *T6,'MENU (8) INCORPORATES A DATA GENERATING ROUTINE TO SAVE'/
     *T6,'THE PROBABILITIES OF A KILL ( P(K) = 1 - P(S) ) FOR'/
     *T6,'LATER PLOTTING.  THIS PLOT MAY BE OBTAINED FROM A'/
     *T6,'TEKTRONIX DUAL SCREEN (TEK618) SYSTEM.  THE P(K)'/
     *T6,'AGAINST THE APPROPRIATE THREAT TYPES ARE PRESENTED.'//
     *T6,'      THREE DESIGNS CAN BE PLOTTED AT A TIME, FOR EXAMPLE'/
     *T6,'YOUR BASELINE DESIGN, YOUR FIRST DESIGN, AND ONE OTHER'/
     *T6,'MODIFICATION.  YOU MUST HAVE DONE AND CHOSEN TO SAVE'/
```

```
     *T6,'PLCTTING DATA FRCM THREE RUNS.'//
     *T6,'     TO CBTAIN THE PLOT, FOLLOW THE SAME LOGON AND LINK'/
     *T6,'PRCCEDURES YOU UTILIZED TO ACCESS VISAP, HOWEVER, ENTER'/
     *T6,'DISVIS INSTEAD OF VISAP. THEN ENTER SUPPLT.'//
     *T6,'         ENTER ANY INTEGER TC RETURN TO MENU (8)')
      READ (5,*)IJK
      GO TO 8
C***********************************************************************
C          TRANSFER
C***********************************************************************
998       CALL FRTCMS('CLRSCRN ')
      WRITE(4,1998)
1998  FORMAT(' ','TRANSFER MENU, SELECT A CODE AS FOLLOWS:'/
     +T6,'MAIN MENU                              ',T51,'MM'/
     +T6,'  AIRCRAFT DESIGN SELECTION    ',T51,'DE'/
     +T6,'    A/C PERFORMANCE INDICATORS  ',T51,'AP'/
     +T6,'    SUSCEPTIBILITY FEATURES     ',T51,'SF'/
     +T6,'    VULNERABILITY FEATURES      ',T51,'VF'/
     +T6,'  COMBAT SCENARIC SELECTION    ',T51,'MS'/
     +T6,'    MISSION PROFILE             ',T51,'MP'/
     +T6,'    THREAT SELECTION            ',T51,'TH'/
     +T6,'  SUSCEPTIBILITY ASSESSMENT    ',T51,'SA'/
     +T6,'    PROBABILITY CF DETECTICN    ',T51,'PD'/
     +T6,'    PROBABILITY CF HIT          ',T51,'PH'/
     +T6,'  VULNERABILITY ASSESSMENT     ',T51,'VA')
      WRITE(4,19981)
19981 FORMAT(' ',T6,'    P(K/H)                              ',T51,'KH'/
     +T6,'    P(K/D)                      ',T51,'KD'/
     +T6,'  SURVIVABILITY ASSESSMENT     ',T51,'SV'/
     +T6,'    P(S) 1:1 AAA (RADAR)        ',T51,'AR'/
     +T6,'    P(S) 1:1 AAA (CPTICAL)      ',T51,'AC'/
     +T6,'    P(S) 1:1 LOW ALT SAM        ',T51,'LS'/
     +T6,'    SINGLE SCRTIE               ',T51,'SS'/
     +T6,'    CAMPAIGN EVALUATION         ',T51,'CE'/
     +T6,'TC EXIT CR PRINT RESULTS     ',T51,'EX'/)
      READ(5,2000) K9Q
      IF(K9Q.EQ.K1(1)) GO TC 110
      IF(K9Q.EQ.K1(2)) GC TC 120
      IF(K9Q.EQ.K1(3)) GO TC 130
      IF(K9Q.EQ.K1(4)) GO TO 140
      IF(K9Q.EQ.K1(5)) GC TC 150
      IF(K9Q.FQ.K2(1)) GO TO 210
      IF(K9Q.EQ.K2(2)) GC TC 220
      IF(K9Q.EQ.K2(3)) GO TO 230
      IF(K9Q.EQ.K3(1)) GC TO 310
      IF(K9Q.EQ.K3(2)) GO TC 320
      IF(K9Q.EQ.K4(1)) GO TO 410
      IF(K9Q.EQ.K4(2)) GO TC 420
```

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      IF(K9Q.EQ.K5(1)) GO TC 510
      IF(K9C.EQ.K5(2)) GO TC 520
      IF(K9Q.EQ.K6(1)) GC TC 610
      IF(K9Q.EQ.K6(2)) GC TC 620
      IF(K9C.EQ.K6(3)) GC TC 630
      IF(K9Q.EQ.K6(4)) GO TC 640
      IF(K9Q.EQ.K6(5)) GO TO 650
      IF(K9Q.EQ.KK(3)) GC TC 999
      IF(K9C.EC.K1(6)) GO TC 100
      WRITE(4,1200)
      GO TO 998
C*****************************************************************
C            EXIT
C*****************************************************************
C- #3 -------------------------------------------------------------
1061         CCNTINUE
             CALL SSRWT(B,W,EL,EC,ED,EL,TW,WS,WT,XL,ICA,ICS,IEA,
C********* SUPPORT A/C WEIGHT ESTIMATICNS RCUTINE *****************
     @       IEP,IFE,IFS,IFV,JAM,IRCS,XMR,XMA,XMT,IWARN,ICHAFF,
     @       BLTOGW,TCGW)
C- #3 -------------------------------------------------------------
C******** TO SAVE CATA ********************************************
      REWIND 3
      WRITE(3,1012)TW,WS,WT,B,XL,W,EC,ED,EL,JAM,IRCS,IWARN,ICHAFF,IFS,
     *       IFV,IFE,IEA,IEP,ICS,ICA,XMR,XMA,XMT,AAAH,AAAD,SAMH,SAMD,PDAO,
     *        PDAR,PCSM,FHR,FHC,PHSM,VAAAA,PKHAAA,VASM,PKHSM,PSAR,PSAO,
     *        PSSM,ACR,X1NPAS,ACR1,NSRT,XNPASS,NS,
     *        ACR2,TCTSR,TCTACK,TOTACL,TOTACR,BLTOGW,TOGW
C
C- #3 -------------------------------------------------------------
      CALL FRTCMS('CLRSCRN ')
       WRITE (4,9200)TW,WS,WT,XMR,AAAH,XMA,AAAD,XMT,SAMH,SAMD
       WRITE(4,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IEP,ICS,ICA
       WRITE(4,9201)
       WRITE(4,9202)PSAO,PDAC,PHO,PKHAAA
       WRITE(4,9203)PSAR,PCAR,PHR,PKHAAA
       WRITE(4,9204)PSSM,PDSM,PHSM,PKHSM
       WRITE(4,9205)
       WRITE(4,9206)ACR1,NSRT,XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR
       WRITE(4,9220)
       WRITE(4,9207)BLTOGW,TOGW
       WRITE(4,9220)
       WRITE(4,9220)
       WRITE(4,8282)
      GO TO 8
C*****************************************************************
999          CONTINUE
            CALL FRTCMS('CLRSCRN ')
```

```
      WRITE(4,9999)
9999  FORMAT('0',' TO PRINT YOUR RESCLTS AND EXIT ENTER  "0"'/
     +,' TO PRINT YOUR RESULTS AND REENTER PROGRAM ENTER "1"'/
     +,' TO EXIT WITHCUT A PRINT ENTER "2"')
      READ(5,*)IJK
      IF(IJK.EC.2) GO TO 99999
C- #4 -----------------------------------------------------------------
       WRITE (6,9200)TW,WS,WT,XMR,AAAH,XMA,AAAD,XMT,SAMH,SAMD
       WRITE(6,2220)JAM,IFS,IRCS,IFV,IWARN,IFE,ICHAFF,IEA,IEP,ICS,ICA
       WRITE(6,9220)
       WRITE(6,9201)
       WRITE(6,9202)PSAO,PDAC,PHO,PKHAAA
       WRITE(6,9203)PSAR,PDAR,PHR,PKHAAA
       WRITE(6,9204)PSSM,PDSM,PHSM,PKHSM
       WRITE(6,9220)
       WRITE(6,9205)
       WRITE(6,9206)ACR1,NSRT,XNPASS,NS,ACR2,TOTSR,TOTACK,TOTACL,TOTACR
       WRITE(6,9220)
       WRITE(6,9207)BLTOGW,TCGW
      IF(IJK.EQ.1) GO TO 1022
C- #3,#4 --------------------------------------------------------------
9200  FORMAT('1',T25,'** CLOSE AIR SUPPORT AIRCRAFT **'///
     *        T30,'* PERFORMANCE FEATURES'//
     *        ,'      THRUST TC WEIGHT',T30,F8.2,
     *        T42,'   WING LCADING',T65,F8.2/
     *        ,'      ORDNANCE WEIGHT',T30,F8.2///
     *        ,' * MISSICN PARAMETERS',T40,' * THREAT PARAMETERS'//
     *        ,'      RADIUS OF ACTION',T30,F8.2,
     *        T42,'   AAA DENSITY',T65,F8.2/
     *        ,'      LOITER ALTITUDE',T30,F8.2,
     *        T42,'   AAA DIAMETER',T65,F8.2/
     *        ,'      TIME ON STATION',T30,F8.2,
     *        T42,'   SAM DENSITY',T65,F8.2/
     *        T42,'   SAM DIAMETER',T65,F8.2//)
C- #3,#4 --------------------------------------------------------------
9201  FORMAT ('0','        * SURVIVABILITY ASSESSMENT:'//
     *        T18,'P(S)       P(D)       F(H)       P(K/H)')
9202  FORMAT (' ',' VS AAA CPTICAL ',4(F4.2,5X))
9203  FORMAT (' ',' VS AAA RADAR   ',4(F4.2,5X))
9204  FORMAT (' ',' VS SAM         ',4(F4.2,5X))
9205  FORMAT ('0','        * CAMPAIGN ANALYSIS:'/)
9206  FORMAT ('0',' INITIAL A/C    ',F8.0,'      NUMBER OF RAIDS    ',I7,/
     +        '  PASSES/SCRTIE ',F8.0,'     SORTIES FOR REPAIR ',I5,/
     +        '  A/C READY     ',F8.0,'     TOTAL SORTIES      ',F8.0,/
     +        '  TCTAL TARGETS ',F8.0,'     TCTAL A/C LOST     ',F8.0,/
     +        '  IN REPAIR     ',F8.0)
9207  FORMAT ('0',' BASELINE TOGW ',F10.2,T36,'ENHANCED TOGW ',F10.2)
9220  FORMAT (' ')
```

```
8282  FORMAT(4('0'))
99999     STOP
          ENC
          SUBRCUTINE SRPDSM(JAMS,IRCSS,PDF)
C*********************************************************************
C*********************************************************************
C*******                                    *****************************
C*******    SUBROUTINE PD LOW ALT SAM       *****************************
C*******       TO MENU PROGRAM              *****************************
C*********************************************************************
C*********************************************************************
      DIMENSION H(2,4,6),F(101),PDT(101),XX(101)
      DATA H/   35.0, 10.3   ,33.8 ,9.8    ,31.8 ,9.5    ,29.1 ,9.1,
     @          19.0, 5.8    ,17.9 ,5.3    ,15.9 ,4.8    ,13.4 ,4.0,
     @          13.4, 4.1    ,12.6 ,3.9    ,11.2 ,3.5    , 9.5 ,3.0,
     @           9.5, 3.0    , 9.0 ,2.9    , 8.5 ,2.7    , 7.5 ,2.5,
     @           5.9, 1.8    , 5.5 ,1.6    , 5.0 ,1.5    , 4.3 ,1.2,
     @           4.3, 1.3    , 3.9 ,1.2    , 3.5 ,1.0    , 2.9 ,0.8/
C****************** FOR ALL ALT .LT. 10,000 FT*************************
          DSR=1.5
C****************** CANT USE ZERO AS A INCICIES***********************
      I=IRCSS+1
      J=JAMS+1
C****************** SELECTS PROPER MEAN AND DEVIATIONS*****************
      X=H(1,I,J)
      S=H(2,I,J)
C******************** CONSTANTS FOR EASE CF WRITING*******************
C- #1 ------------------------------------------------------------------
      CON1=1./(S*SCRT(2.*3.14159))
      CON2=-.5/S**2
C********************INTEGRATION START AT MEANS + 4 DEVIATIONS********
      XI=X+4*S
C********************100 STEPS IN ITEGRATION**************************
      STEP=-S/12.5
C****************** INITIAL VALUES TO START INTEGRATION****************
      F(1)=C.0
      XX(1)=XI
      PDF=0.
      PD=0.
C********************INTEGRATION LOOP**********************************
      DO 10 JJ=1,100
            F(JJ+1)= CCN1*EXP(CON2*(XI-X)**2)
            XI=XI+STEP
            AREA=-.5*STEP*(F(JJ+1)+F(JJ))
            PDT(JJ+1)=PD
               IF(XI.LT.DSR)GO TO 5
                   PDF=PD
5              CONTINUE
```

```
             XX(JJ+1)=XI
             PD=PD+AREA
10       CONTINUE
C######################SETS UP A MINIMUM PD CF .1
         IF(PCF.GT.0.01) GO TO 20
         PDF=.100
20         CONTINUE
         RETURN
         END
               SUBROUTINE SRPHO(TWS,PDAM)
C***************************************************************
C**************   AAA OPTICAL PH *******************************
C***************************************************************
               PH = .1456
               FA = 1.
               FM= ( 1.-.05 * TWS)
               XMF = 1. -(1.-FM)*FA
               PDAM = PH*XMF
               RETURN
               END
               SUBROUTINE SRPHR(TWS,WSS,PDAM)
C***************************************************************
C************** AAA RADAR PH ***********************************
C***************************************************************
                   PH= 1.
                   FA= 1.
C- #1 ---------------------------------------------------------------
                   FM= ( 1.-.15 * TWS)*( 1. - EXP(-1.*(WSS-50.)/10.))
               XMF = 1. -(1.-FM)*FA
               PDAM = PH*XMF
               RETURN
               END
               SUBROUTINE SRPHSM(IWARN,ICHAFF,TWS,WSS,PDAM)
                XXMR = 1.5
C***************************************************************
C**************   SAM PH ***************************************
C***************************************************************
                   PH = .17512
               CALL SRFC (ICHAFF,FC)
C***************************************************************
C**************   MODIFIED FOR CHAFF ***************************
C***************************************************************
                   PH1 = PH * FC
               CALL SRFA (XXMR,IWARN,FA)
C***************************************************************
C**************   MODIFIED FOR MANUVERING **********************
C***************************************************************
             FM = 1.-7.80516*TWS+6.166*(WSS/100.)**8+.907024*(100./WSS)**4
```

```
      IF(FM.LT.0.01)FM = 0.01
            XMF = 1. - (1.- FM) * FA
        PCAM = PH1 * XMF
        RETURN
        END
      SUBROUTINE SRFA(XXMRS,IWARN,FAS)
C***************************************************************
C****** ALERTION FACTOR *****************************************
      REAL MRM(28),FVM(28),FESM(12),MRSM(12)
         DATA FESM/1.,.99999,.97,.91,.82,.69,.53,.35,.22,.137,.065,0./
         DATA MRSM/0.,36.,40.,50.,60.,70.,80.,90.,100.,110.,120.,140./
      DATA MRM/0.,1.,1.94,2.,2.54,3.,3.08,3.48,3.78,4.,4.05,4.23
     A,4.35,4.45,4.55,4.68,4.8,4.9,5.05,5.35,5.8,6.,6.39,7.,7.36
     B,8.,9.,10./
      DATA FVM/1.,.995,.95,.943,.9,.868,.85,.8,.75,.712,.7,.65,.6
     A,.55,.5,.45,.4,.357,.35,.3,.25,.216,.2,.165,.15,.13,.114,.101/
      IF(IWARN.EQ.1)GO TO 15
      KEY=1
5     CONTINUE
         KEY=KEY+1
      IF(MRM(KEY).LT.XXMRS) GO TO 5
      DELTAX=MRM(KEY)-MRM(KEY-1)
      DELTAY=FVM(KEY)-FVM(KEY-1)
      FVS=((XXMRS-MRM(KEY-1))/DELTAX)*DELTAY+FVM(KEY-1)
      FAS = FVS
      GO TO 20
15    CONTINUE
         J=1
10       CONTINUE
         J=J+1
         IF(XXMRS.GE.MRSM(J)) GO TO 10
         DX= MRSM(J-1)-MRSM(J)
         DY= FESM(J-1)-FESM(J)
         FES=((XXMRS-MRSM(J-1))/DX)*DY+FESM(J-1)
         FAS = FES
20     CONTINUE
         RETURN
         END
         SUBROUTINE SRFC(ICHAFF,FC)
         REAL PBTSM(17)
         DATA PBTSM/.00,.19,.35,.49,.6,.68,.74,.8,.83,.86,.9,.92,.935,
     A              .95,.96,.97,.98/
         PBTS=0.
         IF(ICHAFF.EQ.0) GC TO 10
         NBUNDS = 4
         PBTS=PBTSM(NBUNDS+1)
10       FC = 1. - PBTS
         RETURN
```

```
      ENC
      SUBROUTINE SRVASM(IFSS,IFVS,VASMS,PKHSMS)
C***********************************************************************
C**************  VULNERABLE AREA VS SAM ********************************
C***********************************************************************
C************* SET UP VALUES *******************************************
         DATA F1/C./,F2/0./,F3/0./,F4/0./
         IF(IFSS.GE.3)                                         F1 = 1.
         IF((IFSS.NE.1).ANC.(IFSS.NE.3).AND.(IFSS.NE.6)) F2 = 1.
         IF((IFVS.EQ.3).OR.(IFVS.EQ.4).CR.(IFVS.EQ.6)) F3 = 1.
         IF((IFVS.EQ.5).OR.(IFVS.EQ.6))                        F4 = 1.
C************* CALCULATE PK/H VS SAM ***********************************
            ITF = INT(F1+F2+F3+F4)
            GO TC (10,20,30,40),ITF
1              PKHSMS = 1.
            GC TC 50
10             PKHSMS = F1*.984 + F2*.995 + F3*.668 + F4*.911
            GO TO 50
20             PKHSMS = F1*F2*.984 + F1*F3*.521 + F1*F4*.898 +
     &                  F2*F3*.628 + F2*F4*.904 + F3*F4*.324
            GC TC 50
30             PKHSMS = F1*F2*F3*.484 + F1*F2*F4*.896 +
     &                  F1*F3*F4*.223 + F2*F3*F4*.258
            GO TC 50
40             PKHSMS = .182
50          CONTINUE
C************* CALCULATE VULN AREA VS SAM ******************************
               VASMS = 100. * EXP(PKHSMS-1.)
        RETURN
        END
      SUBROUTINE SRVAAA(IFSS,IFVS,IFES,IEAS,IEPS,ICSS,ICAS,A,B,C,D,E,F,
     &VAAAAS,PKFAAS)
C***********************************************************************
C**************  VULNERABLE AREA VS AAA ********************************
C***********************************************************************
        DIMENSION XFE(8),XEA(2)
        DATA XFE/2.,3.,4.,6.,8.,12.,16.,32./
        DATA XEA/2.,1./
C************ NEEDED VARIABLES *****************************************
           WES = 11333. + 1.34555*A*F -.00247249*B*F + .067473*C*E
           FRS = -11.1186*A*B + 18.6825*A*C +.3591*A*F +.236943*B*E
     &           - .0000441459*D*F + .00256493*E*F
           FT = .6 * FRS
C************* SET UP VALUES *******************************************
           FS = FLCAT(IFSS)
           FV = FLCAT(IFVS)
           FE = XFE(IFES) * FT * .001
           EA = XEA(IEAS) * WES * .001
```

```
      EP = FLOAT(IEPS)
      CS = FLOAT(ICSS)
      CA = FLOAT(ICAS)
C************ CALCULATE VULNERABLE AREA ****************************
    VAAAAS = 41.56 - 2.244*ALOG(FE) - 4.373*ALOG(FV) - 4.732*ALOG(FS)
   &             - 5.009*ALOG(CS) + 5.946*ALOG(EA) - 2.491*ALOG(CA)
   &             + 16.44*ALOG(FT*.001) - 47.503 * ALOG(EP)
C************* CALCULATE P(K/H) ************************************
C- #1 ------------------------------------------------------------------
      PKHAAS = 1.- EXP (-1.*VAAAAS/125.)
      RETURN
      END
      SUBROUTINE SORT(
   &XL1,XH1,D1,PKH1,PS1,   XL2,XH2,D2,PKH2,PS2,  XL3,XH3,D3,PKH3,PS3,
   &ACR1,NSRT,XNPAS,NS,            ACR2,TOTSR,TOTACK,TOTACL,TOTACR)
C*******************************************************************
C      XL-PENDIS      H-THREAT DENSITY     D- THREAT DIAMETER
C
C*******************************************************************
C
       W1 = XL1 * XH1 * D1 / 100.
       W2 = XL2 * XH2 * D2 / 100.
       W3 = XL3 * XH3 * D3 / 100.
C
       PSM1 = PS1 ** W1
       PSM2 = PS2 ** W2
       PSM3 = PS3 ** W3
C
       PH1 = (1. - PSM1)/PKH1
       PH2 = (1. - PSM2)/PKH2
       PH3 = (1. - PSM3)/PKH3
C
C***************THREAT 1**************
           H1 = ACR1 * PH1
           XK1 = H1 * PKH1
           A1 = H1 - XK1
C***************THREAT 2**************
              H2 = (ACR1-H1) * PH2
              XK2 = H2 * PKH2
              A2 = H2 - XK2
C***************THREAT 3**************
                 H3 = (ACR1-H1-H2) * PH3
                 XK3 = H3 * PKH3
                 A3 = H3 - XK3
C***************OVER TARGET**************
            ACOVER = ACR1-H1-H2-H3
            ATAC = ACOVER * XNPAS
C***************EGRESS*****************
```

```
C**************THREAT 1**************
              H4 = ACOVER * PH1
              XK4 = H4 * PKH1
              A4 = H4 - XK4
C**************THREAT 2**************
                 H5 = (ACOVER-H4) * PH2
                 XK5 = H5 * PKH2
                 A5 = H5 - XK5
C**************THREAT 3**************
C- #1 -----------------------------------------------------------------
                    H6 = (ACCVER-H4-H5) * PH3
                    XK6 = H6 * PKH3
                    A6 = H6 - XK6
C**************TCTALS FCR SCRTIE********
               ACNHT = ACR1-H1-H2-H3-H4-H5-H6
               ACDAM = A1 + A2 + A3 + A4 + A5 + A6
               ACKIL = XK1 + XK2 + XK3 + XK4 + XK5 + XK6
C*************FOR NEXT SORTIE**********
                     ACR2 = ACNHT
                     TOTSR = ACR1
                     TCTACK = ATAC
                     TOTACL = ACKIL
                     TCTACR = ACDAM
        RETURN
          END
       SUBRCUTINE CAMP(
C*****************************************************************
C*****  SUBROUTINE FOR CAMPAIGN ANALYSIS ***************************
C*****************************************************************
     &XL1,XH1,D1,PKH1,PS1,   XL2,XH2,D2,PKH2,PS2,  XL3,XH3,D3,PKH3,PS3,
     &ACR1,NSRT,XNPAS,NS,           ACR2,TOTSR,TOTACK,TOTACL,TCTACR)
         DIMENSION ACR(200)
           IF(NS.EQ.0)NS = 1
           TOTSR  = 0.
           TCTACK = 0.
           TOTACL = 0.
           TOTACR = 0.
C
         W1 = XL1 * XH1 * D1 / 100.
         W2 = XL2 * XH2 * D2 / 100.
         W3 = XL3 * XH3 * D3 / 100.
C
         PSM1 = PS1 ** W1
         PSM2 = PS2 ** W2
         PSM3 = PS3 ** W3
C
         PH1 = (1. - PSM1)/PKH1
         PH2 = (1. - PSM2)/PKH2
```

```
      PH3 = (1. - PSM3)/PKH3
C
      ACR(1)= ACR1
      DO 10 I = 1,NSRT
C***************INGRESS*****************
          H1 = ACR(I) * PH1
          XK1 = H1 * PKH1
          A1 = H1 - XK1
             H2 = (ACR(I)-H1) * PH2
             XK2 = H2 * PKH2
             A2 = H2 - XK2
                H3 = (ACR(I)-H1-H2) * PH3
                XK3 = H3 * PKH3
                A3 = H3 - XK3
C***************OVER TARGET**************
           ACOVER = ACR(I)-H1-H2-H3
           ATAC = ACOVER * XNPAS
C***************EGRESS*****************
          H4 = ACCVER * PH1
          XK4 = H4 * PKH1
          A4 = H4 - XK4
             H5 = (ACCVER-H4) * PH2
             XK5 = H5 * PKH2
             A5 = H5 - XK5
C- #1 ---------------------------------------------------------------------
                H6 = (ACOVER-H4-H5) * PH3
                XK6 = H6 * PKH3
                A6 = H6 - XK6
C**************TCTALS FCR SORTIE********
           ACNHT = ACR(I)-H1-H2-H3-H4-H5-H6
           ACDAM = A1 + A2 + A3 + A4 + A5 + A6
           ACKIL = XK1 + XK2 + XK3 + XK4 + XK5 + XK6
C**************FOR NEXT SORTIE***********
                 TCTACR = TOTACR+ACDAM
                 ACROUT = TOTACR/FLOAT(NS)
                 TCTACR = TOTACR-ACROUT
                 ACR(I+1) = ACNHT + ACROUT
                 ACR2 = ACR(I+1)
                 TOTSR = TOTSR + ACR(I)
                 TOTACK = TOTACK + ATAC
                 TOTACL = TOTACL + ACKIL
10       CCNTINUE
      RETURN
        END
        SUBROUTINE SSRWT(SPAN,W,DL,EC,ED,EL,TW,WS,WT,XL,ICA,ICS,IEA,
C*******************************************************************
C********* SUPPORT A/C WEIGHT ESTIMATIONS ROUTINE ******************
C*******************************************************************
```

```
@     IEP,IFE,IFS,IFV,JAM,IRCS,XMR,XMA,XMT,IWARN,ICHAFF,
@     BLTOGW,TCGW)
      REAL A,B,C,D,E,F,H,I,J
      A = TW
      B = WS
      C = XMR
      D = XMA
      E = XMT
      F = WT
      G = 0.
      H = 0.
      I = 0.
      J = 0.
C*************************************************************************
   BLTOGW   = .129616E+05 + .425125*F +2.16928*H + 2.227*A*F
  @+.16377*C*E - 13.6801*C*I + 0.272868E-02*E*F +21.1006*F*G
  @-.12935E-04*E*H + 1.672*F*J

C**************************************************************************
C       A/C TCGW OF DESIGN WITH SURVIVABILITY ENHANCEMENT
C**************************************************************************
C       THE FOLLOWING ASSUMPTION MADE;
C           ALL SELF-SEALING DONE FOR 23 MM
C           TWO WING TANKS, FOUR FUSELAGE TANKS, PLUS SUMP TANK(S)
C           DUAL SUMP TANKS HAVE EQUAL VOLUMN OF SINGLE SUMP TANK
C           EACH TANK HOLDS 1/7 OF TOTAL VOLUMN
C           INTERNAL FOAM USE VICE ULLAGE INERTING
C           FIRE EXTINGUSHING VICE EXTERNAL FOAM
C**************************************************************************
           IF(JAM.EQ.0) GO TO 40
              G = .8675 * WS / BLTOGW
40         CONTINUE
C**************************************************************************
C      WEIGHT INCREASE CALCULATIONS
C**************************************************************************
C*******  FR = FUEL REQUIRED FOR MISSION *********************************
   FR = -11.1186*A*B + 18.6825*A*C + 0.3591*A*F + 6853.06*A*J
  @+ 0.236943*B*E + 186.885*C*G -21.0454*C*I - 0.44145E-05*D*F
  @+.00256493*E*F +655.357*E*G + 7.19984*G*H + 142678.*G*J
  @-0.397397E-05*H*H + 0.415838*H*J
C******* WEIGHT INCREASE DUE TO SELF-SEALING ***********************
       XNT = 2.
       IF((IFS.EQ.1).OR.(IFS.EQ.3).OR.(IFS.EQ.6)) XNT = 0.
       IF(IFS.EQ.2) XNT = 1.
    WSSP = 1.49*(2.2*8./7.-1.)*(1./7.)**.75*(FR/6.6)**.64*XNT**.11
C******* WEIGHT INCREASE DUE TO INTERNAL FOAM ***********************
     WF = 0.
       IF((IFV.EQ.4).OR.(IFV.EQ.6)) WF = .0186 * FR/6.6
```

```
C******* WEIGHT INCREASE DUE TO FIRE EXTINGUISHING *****************
      WFE = 0.
         XV = 4./3. * ( ED + 1.) * EC * EL
         IF((IFV.EQ.5).OR.(IFV.EQ.6)) WFE = 10.5 * XV**.26
C******* WEIGHT INCREASE DUE TO DUCT PROTECTION *********************
      XND = 1.
      WBB= 0.
      IF(IEP.EQ.2) XND = 2.
      XS = DL * ED * XND * .5
      IF((IFE.EQ.2).OR.(IFE.EQ.4).OR.(IFE.EQ.6)) WBB = 7.6 * XS
C******* WEIGHT INCREASE DUE TO ARMOR *******************************
      AD = 0.
         IF(ICA.EQ.2) AD = 10.
         IF((ICA.EQ.3).OR.(ICA.EQ.4)) AD = 18.
         IF((ICA.EQ.5).OR.(ICA.EQ.6)) AD = 30.
         WARM = 12. * AD
C******* WEIGHT INCREASE DUE TO ENGINE SEPERATION*******************
         XEB = 0.
         IF(IEA.EQ.1) XEB = 0.
         IF(IEA.EQ.2) XEB = 4.
         IF(IEP.EQ.2) XEB = 6.
         XA = ED * 12.
         XN = 11.
         WENG = 2000.
     WES = WENG * XN * .526 * XA * XEB *.000001
C******* WEIGHT INCREASE DUE TO RAM ********************************
         XTT = .1
         XS = 0.
         IF(IRCS.EQ.1) XS = 10.
         IF(IRCS.EQ.2) XS = 16.
         IF(IRCS.EQ.3) XS = 16. + BLTOGW/WS *.69
         WRAM = XTT * XS * 23.8
C******* WEIGHT INCREASE DUE TO REDUNDANT CONTROLS *********************
         BACKUP = 0.
         IF((ICS.EQ.3).OR.(ICS.EQ.4)) BACKUP = 1.
         XLGP = W + EC + SPAN + XL / 2.
         WRED = BACKUP * (2.207 * XLGP  - 4.79)
C******* WEIGHT INCREASE DUE TO RWR ********************************
        WEW = 0.
        IF(IWARN.EQ.1) WEW = 50.
C******* WEIGHT INCREASE DUE TO RADAR JAMMER ************************
        WJW = 0.
        IF(JAM.EQ.1) WJW = 80.
        IF(JAM.EQ.2) WJW = 100.
        IF(JAM.EQ.3) WJW = 200.
        IF(JAM.EQ.4) WJW = 500.
        IF(JAM.EQ.5) WJW = 1000.
C******* WEIGHT INCREASE DUE TO CHAFF DISPENSER *********************
```

```
      WCD = 0.
      IF(ICHAFF.EQ.1) WCD = 86.
C******* WEIGHT INCREASE DUE TO SUBMERGED STORE ************************
      WSCR = 0.
      IF(IRCS.EQ.3) WSOR = 1.13 * WT/100.
C************************************************************************
C******* TOTAL WEIGHT INCREASE *******************************************
     H =  WSSP+WF+WFE+WBB+WARM+WES+WRAM+WRED+WFW+WJW+WCD+WSOR
C************************************************************************
C******* TOTAL TOGW ON ENHANCED A/C**************************************
C************************************************************************
    TOGW   = .129616E+05 + .425125*F +2.16928*H + 2.227*A*F
   @+.16377*C*E - 13.6801*C*I + 0.272868E-02*E*F +21.1006*F*G
   @-.12935E-04*E*H + 1.672*F*J
       RETURN
       END
```

```
C*********************************************************************
C**                                                                 **
C**      SUPPLT < SUPPORT PLOT >                                    **
C**      PROGRAM TO GRAPH P(K)'S VS. THREATS AGAINST                **
C**      CLOSE AIR SUPPORT AIRCRAFT                                 **
C**                                                                 **
C*********************************************************************
      DIMENSION YO(3),Y1(3),Y2(3),Y3(3),XC(3),IPKRAY(400)
     *         ,LABEL(20)
      DATA LABEL/' ',' ',' ',' ','AAA(','()OP','TICA','L()',
     *           'AAA(','()RA','DAR(',')) ',
     *           'SAM ',' ',' ',' ',' ',' ',' ',' '/
      DATA YO/0.,0.,0./
      DATA XC/1.,2.,3./
C
      READ(9,900)(Y1(I),I=1,3),(Y2(I),I=1,3),(Y3(I),I=1,3)
  900 FORMAT(F4.2)
C
      CALL TEK618
      CALL HWROT('MOVIE')
      CALL BLOWUP (1.4)
      CALL PAGE(8.5,11.)
      CALL NOBRDR
      CALL AREA2D(6.,8.5)
      CALL XNAME('THREATS$',100)
      CALL YNAME('P(()K())$',100)
      CALL SWISSM
      CALL SHDCHR(90.,1,.003,1)
      CALL BASALF('STAND')
      CALL MIXALF('L/CSTD')
      CALL HEADIN('CLOSE AIR SUPPORT AIRCRAFT$',100,1.5,2)
      CALL HEADIN('L(OSS) R(ATE) VS. T(HREAT) T(YPE)$',100,1.1,2)
      CALL YREVTK
      CALL YAXANG(0.)
      CALL XTICKS(0)
      CALL XAXEND('NOENDS')
      CALL YAXEND('NOLAST')
      CALL SWISSL
      CALL HEIGHT(.12)
      CALL FRAME
      CALL THKFRM(.10)
      CALL XLABGR(LABEL,4,5,0.,.1,1.1)
      CALL BLREC(0.01,8.1,4.29,0.6,0)
      CALL BLREC(4.3,7.7,1.7,1.0,0)
      CALL BLKEY(IC)
      CALL CLUSTR(3,.08)
      CALL HEIGHT(.08)
      CALL BARDOC('SECOND','OUTSIDE',2)
```

```
CALL BLBAR
CALL VBARS('LABEL',YO,Y1,3)
CALL VBARS('LABEL',YO,Y2,3)
CALL VBARS('LABEL',YO,Y3,3)
CALL HEIGHT(.05)
CALL DOT
CALL GRID(0,2)
CALL RESET('DOT')
CALL HEIGHT(.10)
CALL BLOFF(IC)
MAXLIN=LINEST(IPKRAY,400,40)
CALL LINES('B(ASELINE)$',IPKRAY,1)
CALL LINES('1ST D(ESIGN)$',IPKRAY,2)
CALL LINES('2ND D(ESIGN)$',IPKRAY,3)
CALL LEGEND(IPKRAY,3,4.5,7.6)
CALL ENDPL(0)
CALL DONEPL
STOP
END
```

LIST OF REFERENCES

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Corrections and improvements to the interactive computer program for survivability evaluation of aircraft conceptual designs (VISAP).